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LANGUAGE IDENTIFICATION BY STATISTICAL ANALYSIS

Morton David Rau

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THESIS

LANGUAGE IDENTIFICATION BY STATISTICAL ANALYSIS

by

Morton David Rau

September 1974

Thesis Advisors: R. A. Weitzman, V. M. Powers

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Language Identification

by

Statistical Analysis

by

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ABSTRACT

An analysis was conducted of English and Spanish text. The statistical analysis determined the independent probability of letters and the joint probability of various letter combinations for large samples of each language.

Various methods were tested in an attempt to utilize these characteristics to identify the language of a short sample text. By use of the joint probability of various vowel-consonant relationships and the Kolmogorov-Smirnov Goodness of Fit Test an identification system was defined that provided a significance level of .0077 for a sample of 107 letters (approximately 21 words). Investigation also showed that the space rate or the interword structure in each language contains a measure of intelligence and was useful in identification.

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I. INTRODUCTION

In today's world of ever increasing written collections it requires a certain level of expertise to properly identify and file the material according to its language. In addition to libraries this requirement exists within large government agencies such as the State Department and in various intelligence collection agencies. Although it would be expedient for the staff of these repositories to recognize and understand every language used it does not seem to be a practical requirement. It would at least seem desirable that these persons be provided with a simple method for identifying the language even if they were unable to read the words. An approach to this problem would be to have the clerk utilize a computer terminal to enter a short sample of the text which would be analyzed by the computer and then display the identified language on the terminal. The question that arises is how would the computer determine what language the sample represented. This was the problem approached in this research.

There have been many works published on the subject of mathematical linguistics most of which seem to concern themselves with identifying the author of various literary works or style analysis of individuals or regions. One investigator, Yukio Nakamura, has developed a language identification method for some twenty-five languages based upon the probability of occurrence of various specific characters and words in each language [Ref. 1].

Since language is basically a code used to convey information it would seem that each should have a particular characteristic that would

allow identification based on a statistical pattern. It was the intent of this research to design a set of computer programs which would analyze character frequency and order of occurrence in languages which are written in the Modern Latin Alphabet and then to utilize this data to identify an unknown sample.

II. BACKGROUND

A. ANALYTICAL CONSIDERATIONS OF THE MODERN LATIN ALPHABET

The Modern Latin Alphabet consists of the basic twenty-six characters, additional special characters and characters combined with diacritical signs. Very few languages utilize only the basic twenty-six characters. English is one which relies upon the basic twenty-six, except for loan words and less fashionable use of diacritics, such as 'coördinate'.

Many languages utilize additional characters which can be divided into three classifications:

1. Single characters, e.g., ß in German.
2. Joint characters, e.g., œ in French.
3. Combined characters, e.g., ch in German or Spanish. In some languages these combinations are looked upon as individual letters and have their appropriate place in the alphabet. For the purposes of this analysis they have been considered to be two individual letters.

Diacritical marks are generally used to indicate a difference in pronunciation of a letter but in some languages the marked letter is considered to be a distinct letter, such as the ü in German. In basic linguistics they are classified as modified letters and accordingly for the purposes of this study were treated as forms of the basic letter.

Having defined the criteria for the alphabet to be analyzed the question which arose was to what extent should the interrelationship of letters be considered. It was decided that limiting the interrelationship considerations to three adjacent letters would provide sufficient

indication of trends in letter relationships without broaching too greatly into the influences of word structure. Given any three adjacent characters (X_n, X_{n+1}, X_{n+2}) it was decided to evaluate the frequencies of the following events:

1. Independent occurrence of each character, X_n.

2. Joint occurrence of each pair, X_n, X_{n+1}.

3. X_n, -, X_{n+2}: the joint occurrence of a given letter X_{n+2} as the second letter following a given X_n.

4. Vowel-Consonant relationship in the form of the occurrence of:

   a. vowel following vowel;

   b. consonant following vowel;

   c. vowel following consonant;

   d. consonant following consonant.

Such characteristics as the occurrence of X_n, X_{n+1} generate 676 (26 x 26) combinations for the English Language. This has to be compared to at least the same number from any given sample. An extensive review of works on statistical linguistic analysis and nonparametric statistics resulted in the selection of two tests as a possible means of comparing a sample with a language population. These were a characteristic 'K' devised by the British statistician G. Udny Yule and the Kolmogorov-Smirnov Test of Goodness of Fit, which are discussed below.

B. YULE'S CHARACTERISTIC (K)

G. Udny Yule was involved in conducting statistical analysis of accident distribution among various people when faced with the problem of measuring the liability of classes of people independent of the period of exposure to risk or the total number of accidents met by the whole

group at risk. As a solution to this problem he developed an equation which yielded what he termed the 'characteristic' which was nothing more than a measure of the whole group's liability. By comparing accident rate or liability to repetitiveness of words in a literary work he proposed the use of this characteristic as a measure of repetitiveness in literature. The characteristic is expressed simply as a numerical value, such as 10.6, or 97.5, or 874.3. Since the analysis of each language and sample was to measure frequency of occurrence it was felt that this measure could be said to be analogous to repetitiveness as defined by Yule.

In general, Yule's approach was to determine for a given literary work how many common nouns occurred (were used) once, how many occurred twice, thrice, etc. He then performed the following calculations to obtain the characteristic (K).

X = occurrence category, i.e., X times occurring

f_x = frequency of X, i.e., the number of words occurring X times

$$S_1 = \sum_{x=1}^{n} f_x X$$

$$S_2 = \sum_{x=1}^{n} f_x X^2$$

$$K = 10{,}000 \frac{S_2 - S_1}{(S_1)^2}$$

The number 10,000 was introduced simply to avoid the inconvenience of handling very small numbers [Ref. 2].

Adaptation of this measurement to the $m \times n$ matrix generated by determination of letter occurrences was as follows:

$$S_1 = \sum_{x=1}^{n} f_x X = f_1(1) + f_2(2) + \ldots + f_n(n)$$

$$S_2 = \sum_{x=1}^{n} f_x X^2 = f_1(1)^2 + f_2(2)^2 + \ldots + f_n(n)^2$$

Instead of X being used to relate the frequency of a word it was equated to the frequency of a specific letter combination.

$\therefore$ Let: $X = Y_{m,n}$ = frequency of occurrence of the mn letter combination

$$f_x = f_{y_{m,n}} = 1$$

$$\therefore S_1 = 1(Y_{1,1}) + 1(Y_{1,2}) + \ldots + 1(Y_{m,n})$$

$$\boxed{S_1 = \sum_{m=1}^{m} \sum_{n=1}^{n} Y_{m,n}}$$

Similarly:

$$\boxed{S_2 = \sum_{m=1}^{m} \sum_{n=1}^{n} (Y_{m,n})^2}$$

This adaptation yields a single value or measure of repetitiveness in a specific category for each language population and sample.

C. KOLMOGOROV-SMIRNOV TEST OF GOODNESS OF FIT

Let X be a random variable with the continuous probability distribution function $f(x) = \text{Prob}\left[X \leq x\right]$ and let $X_1, X_2, \ldots, X_n$ be a sample of independent variables of size n for X, ordered so that $X_1 \leq X_2 \leq \ldots \leq X_n$ which determines the empirical distribution function

$$f_n(x) = \begin{cases} 0 \text{ for } x < X_1 \\ (k/n) \text{ for } X_k \leq x \leq X_{k+1} \quad k = 1, 2, \ldots, n-1, \\ 1 \text{ for } X_n \leq x \end{cases}$$

It should be expected that for n large, $f_n(x)$ would very likely approach $f(x)$. Kolmogorov defined the statistic

$$D_n = \text{least upper bound of } \left| f(x) - f_n(x) \right|$$

which measures the greatest absolute diffierence between $f(x)$ and $f_n(x)$. He further showed that it has the following properties which assists in determining how closely $f_n(x)$ represents the population $f(x)$:

1. the probability distribution of D_n depends on n but is independent of $f(x)$, (the maximum D_n is a random variable)

2. the probability distribution of D_n is given by the relationship

$$\lim_{n \to \infty} \text{Prob} \left[D_n < \frac{z}{\sqrt{n}} \right] = 1 - 2 \sum_{k=1}^{\infty} (-1)^{k-1} e^{-2k^2 z^2} = L(z)$$

[Refs. 3, 4, 5, and 6].

The function $L(z)$ has been tabulated by N. Smirnov [Ref. 7]. From the equation $D_n\sqrt{n} = z$ a value of z is obtained to enter the tables and thereby determine $\text{Prob}\left[D_n < \frac{z}{\sqrt{n}}\right]$ or find the significance level of the fit as $1 - L(z)$. These values have been computed and are tabulated in Appendix E.

Prior to continuing some comment should be made as to the selection of the Kolmogorov-Smirnov Test over the Chi-Squared Test. The Chi-Squared test requires a large sample size, because n at finite values is not distribution-free and only approaches this condition as n approaches infinity [Refs. 4 and 8].

III. EXPERIMENTS

A. GENERAL ANALYSIS CONSIDERATIONS

In considering the alphabetic structure of a language there is no doubt as to the fact that the letters carry a certain amount of intelligence but it was not certain as to what effect if any was played by the space, other than to separate words. In order to determine the effect of the space as a character in identifying a language two analytical approaches were taken in evaluating the characteristics described in section II. A. The first (version one, Appendix G) was to conduct the analysis considering spaces as separators, not characters. All characters not described as alphabetic, such as the period, comma, etc., were considered to be spaces and signified only the termination of a word. Joint frequencies such as that of X_n, X_{n+1} were counted only when the pair occurred within the same word. This resulted in the measurement of the desired characteristics exclusively within words, without measuring the interword relationships. The second approach (version two, Appendix H) was to consider the space and nonalphabetic characters between words as a space character. This resulted in the measurement of such characteristics as frequency of first letter occurrence, frequency of last letter occurrences, and the interword relationship of last letter to first letter.

B. GENERAL PROGRAMING CONSIDERATIONS

All computer programs were written in American National Standard COBOL.

Input language samples were fed to the programs via standard eighty column punch cards in the following format:

Card Column	Content
1, 2	Blank
3 - 72	Text
73	Blank unless the last word on the previous card could not be completed in column 72, then a '-' was placed in column 73 to signify continuation on the next card.
74 - 80	Sequence Number

Only alphabetic text with normal punctuation was used for input text. Numeric characters appearing in the various text material were converted to their alphabetic equivalent. To allow for the compilation of data from languages which utilize special characters the keypunch characters 1, 2, 3, 4, and 5 were allocated to those classified as vowels while 6 and 7 were for consonants. This conversion, if required, had to be performed by the operator at the time of entry or during data preparation.

In those programs that were written to consider the space as a character of the alphabet, all interword spaces and punctuation marks were compressed to one space.

C. POPULATION PARAMETERS

The actual population in the case of written text is potentially infinite. Due to limited resources it was decided to test the theory using representative samples of two languages as a measure of their respective populations. The source of these population samples was

chosen to be Reader's Digest as it is available in many languages and contains several short articles, by different authors, which have been selected from various areas of interest, thereby suppressing the influence of one person's or region's style on the assumed population.

The English population consisted of text material, excluding advertisements, from Reader's Digest, Vol. 104, No. 623, March 1974, pages 8, 11, 12, 31 - 90, 109 and 110. This text consists of 79,185 characters excluding spaces and 96,100 characters including spaces.

The Spanish population consisted of text material, excluding advertisements, from Selecciones Del Reader's Digest, Vol. 67, No. 402, May 1974, pages 3 - 10, 21 - 30, 37-60, and 75 -80. This text consists of 78,851 characters excluding spaces and 94,992 characters including spaces.

Both populations were analyzed for the characteristics described in section II. A. (with and without space consideration) and the following population means were obtained:

1. Yule's 'K' based on the independent occurrence of each character, X_n;
2. Yule's 'K' based on the joint occurrence of X_n, X_{n+1};
3. Yule's 'K' based on the joint occurrence of X_n, -, X_{n+2};
4. Probability table for the independent occurrence of X_n;
5. Joint probability table for the occurrence of X_n, X_{n+1};
6. Joint probability table for the occurrence of X_n, -, X_{n+2};
7. Joint probability table for vowel-consonant occurrence.

(A tabulation of these values is contained in Appendices A, B, C, and D) Each probability table was formed into a cumulative relative frequency

curve, the points of which were transferred to punched cards, for later use in testing samples by the Kolmogorov-Smirnov Goodness of Fit Test.

In order to facilitate the use of Yule's 'K' in testing small samples it was necessary to approximate the standard deviation (σ) for each value of Yule's 'K'. The population was divided into groups of ten card samples from which a new 'K' was determined for each sample. The following calculations were then performed:

K = Yule's 'K' obtained from each sample of 10 cards (less than 700 characters).

n = number of 10 card samples contained in the population.

$\overline{K} = \frac{\sum K}{n}$ = mean value of Yule's 'K'.

$$\therefore \sigma_{10} = \sqrt{\frac{(\sum K^2 - n\overline{K})}{(n - 1)}}$$

σ_{10} was then adjusted to a population standard deviation based on one card samples by computing

$$\sigma = \sigma_{10}\sqrt{10}$$

[Ref. 8].

(Values of σ are contained in Appendices A, B, C, and D.) A histogram was plotted for the various values of Yule's 'K' and they appeared to conform to a normal distribution.

D. TESTING PROCEDURES

In constructing testing procedures there were two approaches which were considered. The first was that a small sample would be analyzed and identified as either English or Spanish. The second approach was to analyze a small sample and then report it as either English, Spanish, or undecisive based upon some predefined constraints. Since it was

intended, if the theory worked, that the process could be expanded to cover all languages written in the Modern Latin Alphabet it was felt that the first approach was more realistic (useful).

1. Testing by Yule's K

Since the incremental population samples of ten cards appeared to conform to the normal distribution it was assumed that for all languages the value of K obtained from small samples would conform to the normal distribution. For each sample tested three values of K were obtained, one for each of the three K tests. Each value of K was then compared to its respective population mean, μ, obtained from the representative population analysis, in each language in order to determine the appropriate normal deviate, z, by

$$z = \frac{K - \mu}{\sigma / \sqrt{n}}$$

where n was the number of data cards in that particular sample. For each of the three tests the z for English was compared with the z for that test in Spanish. The smallest absolute value of z identified the language or that language to which the sample had the highest probability of belonging. The smallest z from each test was then used to compute the significance level, α, as a measure of how closely K and μ matched based on the probability of a normal distribution. For absolute values of z less than 4.0, α was computed as follows:

$$x = |z|$$

$$\alpha = 1 - 2x(.39894,22804,014) \left[1 - \frac{1}{6}x^2 + \frac{P}{6.66666,66666,67} x^2 - \frac{P}{8.4} + \frac{P}{10.28571,42857,1} x^2 - \frac{P}{12.22222,22222,2} x^2 + \frac{P}{14.18181,81818,2} x^2 - \frac{P}{16.15384,61538,5} x^2 \right.$$

$$+ \frac{P}{18.13333,33333,3} x^2 - \frac{P}{20.11764,70588,2} x^2$$

$$+ \frac{P}{22.10526,31578,9} x^2 - \frac{P}{24.09523,80952,4} x^2$$

$$+ \frac{P}{26.08695,65217,4} x^2 - \frac{P}{28.08000,0000,0} x^2$$

$$+ \frac{P}{30.07407,40740,7} x^2 - \frac{P}{32.06896,55172,4} x^2$$

$$+ \frac{P}{34.06451,61290,3} x^2 - \frac{P}{36.06060,60606,1} x^2$$

$$+ \frac{P}{38.05714,28571,4} x^2 - \frac{P}{40.05405,40540,5} x^2$$

$$+ \frac{P}{42.05128,20512,8} x^2 - \frac{P}{44.04878,04878,0} x^2$$

$$+ \frac{P}{46.04651,16279,1} x^2 - \frac{P}{48.04444,44444,4} x^2$$

$$+ \frac{P}{50.04255,3191} x^2 - \frac{P}{52.04081,6326} x^2$$

$$+ \frac{P}{54.03921,5686} x^2 - \frac{P}{56.03773,5849} x^2$$

$$+ \frac{P}{58.03636} x^2 - \frac{P}{60.03509} x^2 + \frac{P}{62.03} x^2 \Bigg]$$

where P = the absolute value of the preceding term [Ref. 9]. For absolute values of z greater than or equal to 4.0, α was reported as being less than 0.00006 [Ref. 8].

2. Testing by the Kolmogorov-Smirnov Goodness of Fit Test

For each sample tested four cumulative relative frequency tables were computed, one from each of the probability tables described in section III. C. These tables represented points, $f_n(x)$, on the cumulative relative frequency (CRF) curve for each particular sample. The CRF curve points for the sample were compared against the estimate of the respective curve points, $f(x)$, along the ordinate, for the Spanish and English populations. From each comparison the value of

D_n = least upper bound of $\left|f(x) - f_n(x)\right|$ was obtained. For each of the four tests the value of D_n from the comparison with Spanish was compared to that D_n from the comparison with English. The sample was judged to be of that language which resulted in the smallest D_n. The smallest value of D_n from each test was then used to compute the significance level as a measure of how closely the sample and population CRF curves matched. D_n was then multiplied by the square root of the number of data cards contained in the sample to obtain z. For values of z greater than or equal to 0.28 and less than or equal to 1.82, the significance level was obtained from the table contained in Appendix E. For values of z less than 0.28, α was reported as greater than 0.999999. For values of z greater than 1.82, α was reported as less than 0.002645.

E. RESULTS

In an attempt to construct an unbiased set of samples for final testing, an assortment of short stories, novels, poems, reports, and speeches by one hundred and thirty different authors was selected from several anthologies (Appendix F). The samples within this group were equally split between English and Spanish and covered a period from the twelfth century through the present day. Each sample was taken from the beginning of the particular work and was of such length to fill the prescribed text field of ten punch cards.

Each sample was analyzed four times: once utilizing all ten data cards (534 characters); once utilizing the first five data cards (267 characters); once utilizing the first two data cards (107 characters); and once utilizing only the first data card (53 characters).

Furthermore, each of these were processed once under Language-ID-Version-One (Appendix I) which used the space only as a separator and once under Language-ID-Version-Two (Appendix J) which used the space as a character.

In addition to the seven separate tests described in section III. C., three other tests which were evaluated were:

1. a majority vote of all seven tests;

2. a majority vote of the three tests based on Yule's 'K';

3. a majority vote of the four tests based on the Kolmogorov-Smirnov (K-S) test of goodness of fit.

The following tabulation presents the proportion of correct identifications achieved by each of the ten tests under Language-ID-Version-One (V-1) and Language-ID-Version-Two (V-2).

TABLE I

Proportion of Correct Identifications

No. of Cards	K for X_n		K for X_n, X_{n+1}	
	V-1	V-2	V-1	V-2
10	.9538	.6615	.6000	.6231
5	.9000	.6462	.5769	.6384
2	.7615	.5615	.5846	.6385
1	.7077	.5308	.5154	.5923

	K for X_n, -, X_{n+2}		K-S for Vowel-Cons.	
	V-1	V-2	V-1	V-2
10	.5308	.5846	1.0000	SAME AS V-1
5	.5077	.5923	1.0000	
2	.4615	.5461	.9923	
1	.5000	.5231	.8770	

	K-S for X_n		K-S for X_n, X_{n+1}	
	V-1	V-2	V-1	V-2
10	1.0000	1.0000	.9923	1.0000
5	.9769	.9769	.9230	.9846
2	.9348	.9348	.8539	.9615
1	.8770	.8693	.7230	.8539

No. of Cards	K-S for X_n, -, X_{n+2}		Majority Vote	
	V-1	V-2	V-1	V-2
10	.9307	1.0000	.9846	1.0000
5	.8770	.9769	.9615	1.0000
2	.8154	.9308	.9230	.9615
1	.7521	.8153	.8923	.8923

	Majority of K		Majority of K-S	
	V-1	V-2	V-1	V-2
10	.6385	.6154	.9923	1.0000
5	.6615	.6118	.9461	.9769
2	.6308	.5770	.8923	.9461
1	.5846	.5384	.7846	.8385

IV. CONCLUSIONS

The following observations have been made based upon the results presented in section III. E.

1. Yule's characteristic 'K' by itself was not a reliable measure for identifying the language based on a small sample. Two factors could have affected this measure: first was the close proximity of the mean values when viewed in light of the standard deviation; secondly was that with only twenty-six letters being considered there was too great a chance of repetitiveness which in fact was what Yule was measuring.

2. It was observed that a higher proportion of correct identifications occurred when the sample was analyzed using the space as a character. Accordingly it was concluded that the space rate or the interword structure in each language does contain a measure of intelligence and was useful in identification.

3. The use of the Kolmogorov-Smirnov Goodness of Fit Test when applied to vowel-consonant relationships proved to be the most reliable single test with a significance level of 0.0077 for a sample of approximately 107 characters.

4. No majority vote test was as reliable as the vowel-consonant test but the test based on a majority of the seven individual tests did prove to be the second most reliable test. In view of the fact that this test incorporated the results of three low-reliability Yule's 'K' tests it is subject to some doubt as to how reliable it would prove if the program were expanded to include more than two languages.

Although the experiments using only two languages could not produce conclusive evidence, this research tends to support the belief that each language does possess some statistical characteristic which would allow identification using a short sample of text. Expansion of this research to include additional languages would be useful in determining the reliability of this type of identification system when used with short samples of text.

APPENDIX A. ENGLISH POPULATION VALUES (V-1)

1. Yule's 'K' based on the independent occurrence of each character X_n:

Mean value	645.079
Standard Deviation	81.479

2. Yule's 'K' based on the joint occurrence of X_n, X_{n+1}:

Mean value	87.168
Standard Deviation	40.207

3. Yule's 'K' based on the joint occurrence of X_n, -, X_{n+2}:

Mean value	62.083
Standard Deviation	42.821

TABLE II. ENGLISH JOINT PROBABILITY TABLE FOR VOWEL-CONSONANT

		First Letter	
		Vowel	Consonant
Second Letter	Vowel	.0512	.3568
	Consonant	.3549	.2371

TABLE III. ENGLISH (V-1) INDEPENDENT PROBABILITY OF X_n

X_n	Probability
A	.0800
E	.1214
I	.0710
O	.0774
U	.0284
B	.0138
C	.0313
D	.0418
F	.0222
G	.0217
H	.0502
J	.0017
K	.0072
L	.0445
M	.0255
N	.0731
P	.0210
Q	.0008
R	.0631
S	.0640
T	.0880
V	.0112
W	.0188
X	.0020
Y	.0191
Z	.0008

TABLE IV. ENGLISH (V-1) JOINT PROBABILITY TABLE FOR X_n, X_{n+1}

X_{n+1} \ X_n	A	E	I	O	U	B	C	D	F	G	H	J	K
A	.0000	.0072	.0016	.0012	.0010	.0022	.0065	.0022	.0015	.0019	.0096	.0001	.0001
E	.0000	.0050	.0030	.0004	.0013	.0046	.0046	.0058	.0019	.0040	.0271	.0005	.0029
I	.0033	.0020	.0000	.0010	.0010	.0012	.0022	.0038	.0040	.0014	.0086	.0000	.0012
O	.0000	.0007	.0062	.0025	.0001	.0021	.0085	.0038	.0058	.0016	.0065	.0006	.0001
U	.0011	.0002	.0000	.0125	.0000	.0023	.0010	.0013	.0010	.0007	.0019	.0009	.0000
B	.0019	.0002	.0011	.0008	.0006	.0001	.0000	.0001	.0000	.0000	.0001	.0000	.0001
C	.0031	.0040	.0066	.0017	.0017	.0000	.0003	.0001	.0000	.0000	.0000	.0000	.0000
D	.0039	.0133	.0035	.0017	.0007	.0000	.0000	.0005	.0000	.0000	.0000	.0000	.0000
F	.0012	.0012	.0019	.0075	.0002	.0000	.0000	.0000	.0017	.0000	.0000	.0000	.0000
G	.0019	.0009	.0038	.0007	.0016	.0000	.0000	.0000	.0000	.0003	.0000	.0000	.0000
H	.0001	.0002	.0000	.0004	.0000	.0000	.0054	.0001	.0000	.0035	.0000	.0000	.0000
J	.0001	.0000	.0000	.0001	.0000	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000
K	.0012	.0003	.0004	.0010	.0000	.0000	.0026	.0000	.0000	.0000	.0000	.0000	.0000
L	.0106	.0054	.0051	.0052	.0032	.0020	.0013	.0005	.0007	.0006	.0001	.0000	.0000
M	.0031	.0032	.0037	.0052	.0012	.0000	.0000	.0000	.0000	.0000	.0001	.0000	.0000
N	.0201	.0150	.0238	.0170	.0050	.0000	.0000	.0002	.0000	.0008	.0002	.0000	.0006
P	.0013	.0016	.0011	.0024	.0017	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
Q	.0000	.0003	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
R	.0120	.0188	.0033	.0126	.0057	.0007	.0022	.0021	.0019	.0020	.0011	.0000	.0000
S	.0086	.0124	.0085	.0026	.0052	.0002	.0002	.0014	.0001	.0007	.0002	.0000	.0006
T	.0135	.0045	.0093	.0039	.0047	.0001	.0030	.0001	.0018	.0002	.0024	.0000	.0000
V	.0022	.0032	.0035	.0019	.0000	.0000	.0000	.0002	.0000	.0000	.0000	.0000	.0000
W	.0009	.0014	.0000	.0038	.0000	.0000	.0000	.0001	.0001	.0000	.0000	.0000	.0000
X	.0002	.0014	.0006	.0003	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
Y	.0029	.0014	.0000	.0002	.0001	.0015	.0004	.0007	.0001	.0005	.0003	.0000	.0001
Z	.0002	.0001	.0006	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000

TABLE IV - Continued

X_{n+1} \ X_n	L	M	N	P	Q	R	S	T	V	W	X	Y	Z
A	.0053	.0057	.0034	.0030	.0000	.0062	.0035	.0039	.0007	.0047	.0001	.0001	.0002
E	.0095	.0081	.0090	.0048	.0000	.0174	.0080	.0128	.0102	.0047	.0001	.0012	.0005
I	.0070	.0042	.0040	.0012	.0000	.0067	.0048	.0109	.0026	.0034	.0002	.0003	.0001
O	.0035	.0037	.0037	.0035	.0000	.0077	.0033	.0110	.0007	.0031	.0000	.0022	.0001
U	.0009	.0010	.0006	.0009	.0010	.0011	.0027	.0019	.0000	.0000	.0000	.0000	.0000
B	.0000	.0008	.0000	.0000	.0000	.0002	.0002	.0001	.0000	.0000	.0000	.0000	.0000
C	.0000	.0001	.0030	.0000	.0000	.0013	.0013	.0003	.0000	.0000	.0001	.0001	.0000
D	.0031	.0000	.0151	.0000	.0000	.0021	.0001	.0000	.0000	.0000	.0000	.0000	.0000
F	.0006	.0000	.0005	.0000	.0000	.0002	.0001	.0001	.0000	.0000	.0000	.0000	.0000
G	.0000	.0000	.0114	.0000	.0000	.0019	.0000	.0000	.0000	.0000	.0000	.0000	.0000
H	.0000	.0000	.0002	.0007	.0000	.0001	.0032	.0300	.0000	.0035	.0001	.0000	.0000
J	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
K	.0002	.0000	.0008	.0000	.0000	.0011	.0005	.0000	.0000	.0000	.0000	.0000	.0000
L	.0089	.0001	.0004	.0023	.0000	.0008	.0007	.0011	.0000	.0001	.0000	.0006	.0000
M	.0002	.0007	.0004	.0001	.0000	.0012	.0011	.0002	.0000	.0000	.0000	.0001	.0000
N	.0000	.0001	.0008	.0000	.0000	.0018	.0002	.0000	.0000	.0008	.0000	.0001	.0000
P	.0004	.0025	.0001	.0016	.0000	.0004	.0016	.0001	.0000	.0000	.0005	.0000	.0000
Q	.0000	.0000	.0000	.0000	.0000	.0000	.0001	.0000	.0000	.0000	.0000	.0000	.0000
R	.0002	.0001	.0001	.0046	.0000	.0011	.0000	.0040	.0000	.0002	.0000	.0003	.0000
S	.0016	.0008	.0039	.0007	.0000	.0060	.0036	.0029	.0000	.0005	.0000	.0006	.0000
T	.0008	.0000	.0100	.0007	.0000	.0036	.0102	.0017	.0000	.0000	.0007	.0001	.0000
V	.0003	.0000	.0009	.0000	.0000	.0005	.0000	.0000	.0000	.0000	.0000	.0000	.0000
W	.0001	.0000	.0001	.0000	.0000	.0001	.0004	.0018	.0000	.0000	.0000	.0000	.0000
X	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
Y	.0042	.0008	.0010	.0003	.0000	.0021	.0003	.0042	.0001	.0000	.0001	.0000	.0000
Z	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0001	.0000	.0000	.0000	.0000	.0000

TABLE V. ENGLISH (V-1) JOINT PROBABILITY TABLE FOR X_n, -, X_{n+2}

X_{n+2} \ X_n	A	E	I	O	U	B	C	D	F	G	H	J	K
A	.0021	.0039	.0057	.0034	.0032	.0008	.0045	.0012	.0008	.0011	.0011	.0000	.0001
E	.0175	.0150	.0168	.0151	.0045	.0025	.0042	.0034	.0030	.0023	.0015	.0001	.0005
I	.0093	.0070	.0068	.0046	.0031	.0015	.0035	.0011	.0016	.0011	.0014	.0001	.0001
O	.0031	.0034	.0014	.0012	.0009	.0007	.0020	.0009	.0025	.0013	.0014	.0001	.0007
U	.0011	.0018	.0025	.0012	.0004	.0012	.0032	.0003	.0011	.0001	.0031	.0000	.0000
B	.0003	.0007	.0002	.0004	.0006	.0002	.0004	.0001	.0001	.0002	.0002	.0002	.0000
C	.0023	.0028	.0014	.0011	.0010	.0014	.0000	.0021	.0015	.0002	.0012	.0002	.0000
D	.0168	.0037	.0025	.0038	.0058	.0004	.0007	.0017	.0006	.0005	.0021	.0001	.0011
F	.0006	.0013	.0006	.0015	.0005	.0004	.0002	.0003	.0006	.0001	.0001	.0000	.0000
G	.0023	.0027	.0125	.0037	.0009	.0007	.0005	.0002	.0001	.0000	.0008	.0000	.0000
H	.0021	.0012	.0070	.0019	.0026	.0000	.0000	.0001	.0000	.0001	.0000	.0002	.0000
J	.0000	.0000	.0000	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
K	.0024	.0009	.0018	.0028	.0003	.0000	.0000	.0000	.0000	.0000	.0002	.0000	.0000
L	.0067	.0031	.0046	.0086	.0027	.0013	.0038	.0025	.0013	.0005	.0034	.0000	.0002
M	.0009	.0011	.0009	.0021	.0001	.0000	.0034	.0008	.0004	.0002	.0030	.0001	.0001
N	.0026	.0041	.0098	.0051	.0012	.0015	.0085	.0032	.0011	.0018	.0067	.0002	.0015
P	.0017	.0031	.0015	.0023	.0011	.0000	.0007	.0005	.0000	.0001	.0012	.0000	.0001
Q	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0001	.0000	.0000	.0000	.0000	.0000
R	.0021	.0055	.0005	.0053	.0008	.0016	.0024	.0023	.0078	.0020	.0062	.0004	.0004
S	.0068	.0094	.0049	.0088	.0019	.0008	.0027	.0017	.0008	.0019	.0074	.0009	.0003
T	.0084	.0156	.0070	.0087	.0049	.0031	.0013	.0012	.0004	.0045	.0051	.0000	.0003
V	.0004	.0015	.0010	.0006	.0001	.0002	.0002	.0004	.0016	.0008	.0018	.0000	.0000
W	.0001	.0003	.0002	.0001	.0001	.0001	.0001	.0006	.0003	.0000	.0012	.0001	.0001
X	.0000	.0000	.0000	.0000	.0000	.0002	.0000	.0000	.0001	.0000	.0000	.0000	.0000
Y	.0027	.0018	.0020	.0007	.0002	.0007	.0001	.0015	.0005	.0002	.0013	.0000	.0002
Z	.0000	.0000	.0001	.0000	.0000	.0000	.0000	.0001	.0000	.0000	.0001	.0000	.0000

TABLE V - Continued

X_{n+2} \ X_n	L	M	N	P	Q	R	S	T	V	W	X	Y	Z
A	.0042	.0016	.0023	.0017	.0005	.0047	.0053	.0069	.0001	.0011	.0001	.0014	.0000
E	.0038	.0019	.0080	.0045	.0004	.0087	.0061	.0317	.0003	.0019	.0006	.0010	.0001
I	.0023	.0012	.0051	.0028	.0003	.0042	.0051	.0054	.0001	.0018	.0002	.0002	.0000
O	.0023	.0006	.0028	.0053	.0000	.0022	.0045	.0104	.0001	.0013	.0001	.0001	.0000
U	.0007	.0005	.0011	.0004	.0000	.0022	.0024	.0011	.0000	.0011	.0000	.0023	.0000
B	.0004	.0001	.0002	.0005	.0000	.0015	.0005	.0005	.0000	.0000	.0000	.0000	.0000
C	.0020	.0011	.0007	.0011	.0000	.0045	.0015	.0025	.0006	.0001	.0001	.0000	.0000
D.	.0021	.0018	.0013	.0009	.0000	.0049	.0021	.0035	.0010	.0004	.0001	.0003	.0002
F	.0008	.0001	.0001	.0000	.0000	.0011	.0005	.0002	.0000	.0002	.0000	.0000	.0000
G	.0014	.0007	.0005	.0001	.0000	.0017	.0004	.0006	.0000	.0001	.0000	.0000	.0000
H	.0004	.0002	.0010	.0000	.0000	.0018	.0006	.0004	.0000	.0000	.0001	.0003	.0000
J	.0000	.0002	.0000	.0000	.0000	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000
K	.0005	.0011	.0000	.0000	.0000	.0001	.0000	.0005	.0000	.0000	.0000	.0000	.0000
L	.0000	.0028	.0030	.0022	.0000	.0030	.0029	.0034	.0013	.0020	.0001.	.0001	.0000
M	.0011	.0002	.0009	.0000	.0000	.0041	.0025	.0026	.0002	.0002	.0001	.0000	.0000
N	.0037	.0070	.0032	.0022	.0000	.0040	.0041	.0052	.0028	.0023	.0001	.0008	.0004
P	.0005	.0000	.0002	.0004	.0000	.0020	.0008	.0007	.0000	.0001	.0000	.0000	.0000
Q	.0000	.0000	.0000	.0000	.0000	.0002	.0000	.0001	.0000	.0000	.0000	.0000	.0000
R	.0039	.0043	.0057	.0055	.0000	.0005	.0040	.0094	.0047	.0037	.0002	.0004	.0002
S	.0042	.0035	.0042	.0016	.0000	.0059	.0015	.0018	.0015	.0031	.0002	.0002	.0000
T	.0038	.0028	.0063	.0013	.0000	.0036	.0011	.0016	.0007	.0028	.0000	.0003	.0001
V	.0008	.0004	.0007	.0000	.0000	.0017	.0014	.0009	.0001	.0004	.0000	.0000	.0000
W	.0013	.0000	.0023	.0002	.0000	.0011	.0002	.0003	.0000	.0000	.0000	.0000	.0000
X	.0000	.0001	.0003	.0000	.0000	.0000	.0008	.0003	.0000	.0000	.0000	.0000	.0000
Y	.0018	.0006	.0022	.0009	.0000	.0025	.0010	.0017	.0000	.0011	.0004	.0000	.0000
Z	.0002	.0001	.0004	.0000	.0000	.0001	.0001	.0001	.0000	.0000	.0000	.0000	.0000

APPENDIX B. SPANISH POPULATION VALUES (V-1)

1. Yule's 'K' based on the independent occurrence of each character X_n:

Mean value	751.447
Standard Deviation	82.328

2. Yule's 'K' based on the joint occurrence of X_n, X_{n+1}:

Mean value	104.553
Standard Deviation	38.094

3. Yule's 'K' based on the joint occurrence of X_n, -, X_{n+2}:

Mean value	72.680
Standard Deviation	35.210

TABLE VI. SPANISH JOINT PROBABILITY TABLE FOR VOWEL-CONSONANT

		First Letter	
		Vowel	Consonant
Second Letter	Vowel	.0616	.4469
	Consonant	.3713	.1202

TABLE VII. SPANISH (V-1) INDEPENDENT PROBABILITY OF X_n

X_n	Probability
A	.1269
E	.1311
I	.0690
O	.0929
U	.0409
B	.0137
C	.0448
D	.0470
F	.0072
G	.0111
H	.0087
J	.0041
K	.0006
L	.0568
M	.0285
N	.0747
P	.0247
Q	.0087
R	.0619
S	.0752
T	.0464
V	.0114
W	.0000
X	.0014
Y	.0089
Z	.0037

TABLE VIII. SPANISH (V-1) JOINT PROBABILITY TABLE FOR X_n, X_{n+1}

X_{n+1} \ X_n	A	E	I	O	U	B	C	D	F	G	H	J	K
A	.0000	.0017	.0115	.0001	.0032	.0055	.0106	.0076	.0009	.0027	.0050	.0012	.0001
E	.0003	.0003	.0108	.0000	.0146	.0013	.0049	.0278	.0015	.0015	.0012	.0013	.0001
I	.0009	.0009	.0000	.0004	.0029	.0033	.0132	.0066	.0026	.0016	.0013	.0001	.0002
O	.0003	.0011	.0104	.0003	.0002	.0013	.0133	.0119	.0015	.0024	.0028	.0019	.0001
U	.0012	.0006	.0002	.0000	.0000	.0008	.0047	.0017	.0014	.0028	.0006	.0006	.0000
B	.0066	.0006	.0017	.0020	.0008	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
C	.0081	.0062	.0070	.0033	.0022	.0000	.0011	.0000	.0000	.0000	.0000	.0000	.0000
D	.0101	.0037	.0053	.0026	.0015	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
F	.0005	.0013	.0008	.0007	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
G	.0008	.0029	.0021	.0011	.0004	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
H	.0003	.0000	.0000	.0000	.0000	.0000	.0035	.0000	.0000	.0000	.0000	.0000	.0000
J	.0009	.0014	.0004	.0004	.0003	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000
K	.0000	.0001	.0000	.0001	.0000	.0000	.0001	.0000	.0000	.0000	.0000	.0000	.0000
L	.0116	.0139	.0048	.0037	.0020	.0018	.0009	.0000	.0004	.0003	.0000	.0000	.0001
M	.0054	.0035	.0041	.0053	.0012	.0000	.0000	.0001	.0000	.0000	.0000	.0000	.0000
N	.0176	.0302	.0095	.0164	.0111	.0000	.0001	.0000	.0000	.0002	.0001	.0000	.0000
P	.0015	.0011	.0005	.0014	.0008	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
Q	.0006	.0003	.0002	.0001	.0000	.0000	.0000	.0001	.0000	.0000	.0000	.0000	.0000
R	.0173	.0162	.0028	.0102	.0031	.0026	.0009	.0011	.0008	.0023	.0000	.0000	.0000
S	.0157	.0234	.0049	.0230	.0032	.0005	.0000	.0000	.0000	.0000	.0000	.0000	.0001
T	.0038	.0037	.0035	.0021	.0011	.0001	.0029	.0000	.0000	.0000	.0000	.0000	.0000
V	.0009	.0015	.0024	.0023	.0003	.0000	.0000	.0001	.0000	.0000	.0000	.0000	.0000
W	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
X	.0001	.0014	.0000	.0002	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
Y	.0009	.0002	.0000	.0004	.0006	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
Z	.0009	.0014	.0008	.0002	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000

TABLE VIII. Continued

X_{n+1} \ X_n	L	M	N	P	Q	R	S	T	V	W	X	Y	Z
A	.0202	.0076	.0109	.0079	.0000	.0156	.0051	.0140	.0029	.0000	.0002	.0009	.0022
E	.0076	.0086	.0047	.0051	.0000	.0129	.0110	.0146	.0048	.0000	.0000	.0004	.0000
I	.0059	.0063	.0045	.0020	.0000	.0090	.0068	.0081	.0049	.0000	.0005	.0000	.0000
O	.0114	.0053	.0094	.0063	.0000	.0109	.0063	.0113	.0015	.0000	.0001	.0009	.0011
U	.0011	.0023	.0023	.0021	.0110	.0017	.0046	.0024	.0001	.0000	.0000	.0001	.0001
B	.0001	.0019	.0000	.0000	.0000	.0002	.0000	.0000	.0000	.0000	.0000	.0000	.0000
C	.0002	.0000	.0048	.0000	.0000	.0011	.0018	.0000	.0000	.0000	.0001	.0000	.0001
D	.0003	.0000	.0047	.0000	.0000	.0014	.0003	.0000	.0000	.0000	.0000	.0000	.0000
F	.0002	.0000	.0010	.0000	.0000	.0000	.0002	.0000	.0000	.0000	.0000	.0000	.0000
G	.0007	.0000	.0012	.0000	.0000	.0014	.0001	.0000	.0000	.0000	.0000	.0000	.0000
H	.0000	.0000	.0001	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0001
J	.0000	.0000	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
K	.0000	.0000	.0001	.0000	.0000	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000
L	.0043	.0000	.0001	.0022	.0000	.0009	.0002	.0001	.0000	.0000	.0000	.0000	.0000
M	.0006	.0000	.0001	.0000	.0000	.0027	.0009	.0000	.0000	.0000	.0000	.0000	.0000
N	.0000	.0000	.0005	.0000	.0000	.0006	.0000	.0000	.0000	.0000	.0000	.0001	.0000
P	.0002	.0037	.0000	.0000	.0000	.0003	.0025	.0000	.0000	.0000	.0004	.0000	.0000
Q	.0001	.0000	.0006	.0000	.0000	.0003	.0001	.0000	.0000	.0000	.0000	.0000	.0000
R	.0001	.0000	.0001	.0049	.0000	.0021	.0000	.0076	.0000	.0000	.0000	.0000	.0000
S	.0004	.0000	.0026	.0001	.0000	.0020	.0000	.0000	.0000	.0000	.0000	.0000	.0000
T	.0012	.0000	.0176	.0002	.0000	.0030	.0098	.0001	.0000	.0000	.0003	.0000	.0000
V	.0006	.0000	.0009	.0000	.0000	.0007	.0000	.0000	.0000	.0000	.0000	.0000	.0000
W	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
X	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
Y	.0002	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
Z	.0001	.0000	.0008	.0000	.0000	.0003	.0000	.0000	.0000	.0000	.0000	.0000	.0000

TABLE IX. SPANISH (V-1) JOINT PROBABILITY TABLE FOR X_n, -, X_{n+2}

X_{n+2} \ X_n	A	E	I	O	U	B	C	D	F	G	H	J	K
A	.0196	.0140	.0169	.0095	.0106	.0031	.0094	.0024	.0007	.0023	.0000	.0001	.0000
E	.0128	.0113	.0056	.0084	.0030	.0047	.0052	.0022	.0020	.0020	.0003	.0001	.0000
I	.0171	.0134	.0097	.0091	.0036	.0016	.0043	.0005	.0003	.0015	.0000	.0000	.0000
O	.0158	.0108	.0103	.0084	.0053	.0009	.0086	.0015	.0003	.0016	.0000	.0000	.0001
U	.0034	.0034	.0026	.0016	.0005	.0002	.0015	.0001	.0001	.0003	.0000	.0000	.0000
B	.0011	.0005	.0003	.0012	.0003	.0003	.0010	.0007	.0002	.0001	.0025	.0002	.0000
C	.0024	.0054	.0020	.0012	.0020	.0004	.0008	.0028	.0023	.0004	.0019	.0002	.0000
D	.0035	.0027	.0016	.0021	.0022	.0003	.0025	.0035	.0000	.0005	.0001	.0002	.0000
F	.0002	.0006	.0006	.0004	.0001	.0001	.0001	.0007	.0000	.0000	.0000	.0002	.0000
G	.0021	.0005	.0007	.0011	.0009	.0000	.0002	.0001	.0002	.0000	.0001	.0001	.0000
H	.0008	.0008	.0001	.0008	.0011	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
J	.0000	.0001	.0003	.0003	.0001	.0005	.0000	.0005	.0000	.0001	.0002	.0000	.0000
K	.0002	.0001	.0000	.0002	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
L	.0041	.0025	.0045	.0008	.0023	.0008	.0037	.0042	.0005	.0006	.0006	.0000	.0002
M	.0021	.0018	.0028	.0010	.0003	.0003	.0057	.0012	.0002	.0002	.0014	.0005	.0000
N	.0014	.0020	.0160	.0003	.0031	.0017	.0112	.0035	.0017	.0027	.0011	.0007	.0000
P	.0004	.0051	.0014	.0019	.0005	.0000	.0013	.0002	.0000	.0000	.0001	.0000	.0000
Q	.0007	.0001	.0002	.0003	.0003.	.0000	.0000	.0000	.0000	.0000	.0001	.0000	.0000
R	.0041	.0040	.0037	.0032	.0031	.0021	.0055	.0043	.0018	.0022	.0013	.0008	.0000
S	.0021	.0028	.0047	.0021	.0028	.0008	.0050	.0086	.0006	.0009	.0016	.0010	.0000
T	.0100	.0248	.0055	.0041	.0036	.0009	.0007	.0012	.0005	.0005	.0001	.0003	.0000
V	.0005	.0013	.0007	.0006	.0008	.0000	.0002	.0008	.0000	.0000	.0001	.0007	.0000
W	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
X	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
Y	.0000	.0001	.0000	.0000	.0000	.0001	.0001	.0000	.0000	.0000	.0005	.0000	.0001
Z	.0009	.0006	.0009	.0000	.0001	.0001	.0002	.0000	.0000	.0001	.0003	.0000	.0000

TABLE IX - Continued

X_{n+2} \ X_n	L	M	N	P	Q	R	S	T	V	W	X	Y	Z
A	.0046	.0015	.0090	.0021	.0000	.0093	.0078	.0052	.0007	.0000	.0000	.0000	.0001
E	.0029	.0024	.0149	.0057	.0121	.0076	.0048	.0036	.0016	.0000	.0002	.0000	.0000
I	.0016	.0015	.0073	.0023	.0024	.0047	.0026	.0010	.0003	.0000	.0001	.0000	.0000
O	.0029	.0015	.0113	.0032	.0000	.0077	.0050	.0034	.0007	.0000	.0001	.0001.	.0003
U	.0009	.0001	.0029	.0003	.0000	.0010	.0024	.0007	.0000	.0000	.0000	.0000	.0000
B	.0017	.0002	.0003	.0004	.0000	.0023	.0014	.0016	.0002	.0000	.0000	.0000	.0002
C	.0032	.0016	.0036	.0024	.0000	.0047	.0010	.0042	.0013	.0000	.0001	.0000	.0001
D	.0016	.0023	.0024	.0017	.0000	.0025	.0013	.0049	.0013	.0000	.0000	.0001	.0003
F	.0005	.0000	.0002	.0000	.0000	.0008	.0002	.0006	.0000	.0000	.0000	.0000	.0000
G	.0019	.0005	.0003	.0001	.0000	.0019	.0015	.0010	.0002	.0000	.0001	.0000	.0000
H	.0000	.0000	.0003	.0000	.0000	.0001	.0001	.0000	.0000	.0000	.0000	.0000	.0000
J	.0003	.0006	.0001	.0001	.0000	.0004	.0004	.0001	.0001	.0000	.0000	.0000	.0000
K	.0001	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
L	.0002	.0044	.0020	.0018	.0000	.0013	.0035	.0030	.0011	.0000	.0005	.0000	.0001
M	.0023	.0003	.0012	.0001	.0000	.0028	.0013	.0029	.0004	.0000	.0003	.0000	.0000
N	.0030	.0107	.0020	.0022	.0000	.0066	.0050	.0065	.0019	.0000	.0001	.0002	.0006
P	.0002	.0000	.0001	.0001	.0000	.0022	.0009	.0002	.0000	.0000	.0000	.0000	.0000
Q	.0002	.0001	.0000	.0001	.0000	.0001	.0001	.0000	.0002	.0000	.0000	.0000	.0000
R	.0027	.0047	.0058	.0128	.0000	.0015	.0051	.0072	.0027	.0000	.0004	.0005	.0004
S	.0154	.0053	.0079	.0026	.0000	.0102	.0040	.0072	.0022	.0000	.0003	.0002	.0007
T	.0016	.0021	.0015	.0007	.0000	.0024	.0011	.0010	.0003	.0000	.0000	.0000	.0000
V	.0010	.0004	.0010	.0000	.0000	.0008	.0013	.0016	.0003	.0000	.0000	.0000	.0000
W	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
X	.0000	.0001	.0000	.0000	.0000	.0001	.0001	.0001	.0000	.0000	.0000	.0000	.0000
Y	.0003	.0009	.0000	.0001	.0000	.0003	.0002	.0002	.0001	.0000	.0000	.0000	.0000
Z	.0006	.0000	.0002	.0002	.0000	.0008	.0000	.0002	.0006	.0000	.0000	.0000	.0000

APPENDIX C. ENGLISH POPULATION VALUES (V-2)

1. Yule's 'K' based on the independent occurrence of each character X_n:

Mean value	747.770
Standard Deviation	95.973

2. Yule's 'K' based on the joint occurrence of X_n, X_{n+1}:

Mean value	87.930
Standard Deviation	31.618

3. Yule's 'K' based on the joint occurrence of X_n, -, X_{n+2}:

Mean value	73.139
Standard Deviation	27.466

4.. Vowel-Consonant relationships are displayed in Table II.

TABLE X. ENGLISH (V-2) INDEPENDENT PROBABILITY OF X_n

X_n	Probability
A	.0659
E	.1000
I	.0585
O	.0638
U	.0234
B	.0114
C	.0258
D	.0344
F	.0183
G	.0179
H	.0414
J	.0014
K	.0059
L	.0367
M	.0210
N	.0603
P	.0173
Q	.0006
R	.0520
S	.0528
T	.0725
V	.0093
W	.0155
X	.0016
Y	.0157
Z	.0007
Space	.1760

TABLE XI. ENGLISH (V-2) JOINT PROBABILITY TABLE FOR X_n, X_{n+1}

X_{n+1} \ X_n	A	E	I	O	U	B	C	D	F	G	H	J	K
A	.0000	.0047	.0010	.0008	.0007	.0014	.0042	.0014	.0010	.0012	.0062	.0001	.0001
E	.0000	.0033	.0020	.0002	.0008	.0030	.0030	.0037	.0012	.0026	.0176	.0003	.0019
I	.0022	.0013	.0000	.0007	.0006	.0008	.0014	.0025	.0025	.0009	.0056	.0000	.0008
O	.0000	.0005	.0040	.0016	.0000	.0014	.0055	.0025	.0037	.0010	.0042	.0004	.0001
U	.0007	.0001	.0000	.0081	.0000	.0015	.0017	.0008	.0007	.0005	.0012	.0006	.0000
B	.0013	.0002	.0007	.0005	.0004	.0001	.0000	.0000	.0000	.0000	.0001	.0000	.0000
C	.0020	.0026	.0043	.0011	.0011	.0000	.0002	.0000	.0000	.0000	.0000	.0000	.0000
D	.0025	.0086	.0023	.0011	.0005	.0000	.0000	.0003	.0000	.0000	.0000	.0000	.0000
F	.0008	.0008	.0013	.0049	.0001	.0000	.0000	.0000	.0011	.0000	.0000	.0000	.0000
G	.0012	.0006	.0025	.0005	.0010	.0000	.0000	.0001	.0000	.0002	.0000	.0000	.0000
H	.0000	.0001	.0000	.0002	.0000	.0000	.0035	.0000	.0000	.0023	.0000	.0000	.0000
J	.0001	.0000	.0000	.0001	.0000	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000
K	.0008	.0002	.0003	.0006	.0000	.0000	.0017	.0000	.0000	.0000	.0000	.0000	.0000
L	.0069	.0035	.0033	.0034	.0020	.0013	.0009	.0003	.0005	.0004	.0001	.0000	.0002
M	.0020	.0020	.0024	.0034	.0008	.0000	.0000	.0002	.0000	.0000	.0000	.0000	.0000
N	.0130	.0097	.0154	.0110	.0032	.0000	.0000	.0001	.0000	.0005	.0002	.0000	.0004
P	.0008	.0011	.0007	.0016	.0011	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
Q	.0000	.0002	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
R	.0077	.0122	.0022	.0082	.0037	.0005	.0015	.0014	.0013	.0013	.0007	.0000	.0000
S	.0056	.0080	.0055	.0017	.0034	.0001	.0001	.0009	.0001	.0005	.0001	.0000	.0004
T	.0087	.0029	.0060	.0025	.0030	.0001	.0020	.0000	.0012	.0001	.0015	.0000	.0000
V	.0014	.0021	.0023	.0012	.0000	.0000	.0000	.0001	.0000	.0000	.0000	.0000	.0000
W	.0006	.0009	.0000	.0024	.0000	.0000	.0000	.0001	.0000	.0000	.0000	.0000	.0000
X	.0002	.0009	.0004	.0002	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
Y	.0019	.0009	.0000	.0001	.0001	.0010	.0003	.0004	.0000	.0003	.0002	.0000	.0000
Z	.0001	.0000	.0004	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
Space	.0055	.0329	.0016	.0077	.0008	.0002	.0009	.0194	.0051	.0062	.0036	.0000	.0021

TABLE XI - Continued

X_{n+1} \ X_n	L	M	N	P	Q	R	S	T	V	W	X	Y	Z	Space
A	.0034	.0037	.0022	.0019	.0000	.0040	.0023	.0025	.0005	.0030	.0001	.0001	.0001	.0195
E	.0062	.0053	.0058	.0031	.0000	.0113	.0052	.0083	.0066	.0031	.0001	.0008	.0003	.0045
I	.0045	.0027	.0026	.0008	.0000	.0043	.0031	.0071	.0017	.0022	.0001	.0002	.0001	.0100
O	.0023	.0024	.0024	.0022	.0000	.0050	.0021	.0072	.0004	.0020	.0000	.0014	.0000	.0114
U	.0006	.0006	.0004	.0006	.0006	.0007	.0017	.0012	.0000	.0000	.0000	.0000	.0000	.0020
B	.0000	.0005	.0000	.0000	.0000	.0001	.0002	.0000	.0000	.0000	.0000	.0001	.0000	.0072
C	.0000	.0001	.0019	.0000	.0000	.0009	.0008	.0002	.0000	.0000	.0001	.0000	.0000	.0105
D	.0020	.0000	.0098	.0000	.0000	.0013	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0059
F	.0004	.0000	.0003	.0000	.0000	.0001	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0084
G	.0000	.0000	.0074	.0000	.0000	.0012	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0032
H	.0000	.0000	.0001	.0004	.0000	.0001	.0021	.0194	.0000	.0023	.0001	.0000	.0000	.0107
J	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0012
K	.0002	.0000	.0005	.0000	.0000	.0007	.0003	.0000	.0000	.0000	.0000	.0000	.0000	.0007
L	.0057	.0001	.0003	.0015	.0000	.0005	.0005	.0007	.0000	.0001	.0000	.0004	.0000	.0043
M	.0001	.0005	.0003	.0000	.0000	.0008	.0007	.0002	.0000	.0000	.0000	.0000	.0000	.0077
N	.0000	.0000	.0005	.0000	.0000	.0012	.0001	.0000	.0000	.0005	.0000	.0001	.0000	.0043
P	.0003	.0016	.0001	.0010	.0000	.0003	.0011	.0000	.0000	.0000	.0003	.0000	.0000	.0074
Q	.0000	.0000	.0000	.0000	.0000	.0000	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0003
R	.0001	.0001	.0000	.0030	.0000	.0007	.0000	.0026	.0000	.0001	.0000	.0002	.0000	.0046
S	.0010	.0005	.0025	.0004	.0000	.0039	.0023	.0019	.0000	.0003	.0000	.0004	.0000	.0132
T	.0005	.0000	.0065	.0004	.0000	.0023	.0066	.0011	.0000	.0000	.0005	.0001	.0000	.0264
V	.0002	.0000	.0006	.0000	.0000	.0003	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0011
W	.0000	.0000	.0001	.0000	.0000	.0001	.0003	.0011	.0000	.0000	.0000	.0000	.0000	.0098
X	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
Y	.0027	.0005	.0007	.0002	.0000	.0014	.0002	.0027	.0001	.0000	.0000	.0000	.0000	.0019
Z	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0001	.0000	.0000	.0000	.0000	.0000	.0000
Space	.0064	.0026	.0153	.0016	.0000	.0108	.0230	.0161	.0000	.0019	.0004	.0118	.0000	

TABLE XII. ENGLISH (V-2) JOINT PROBABILITY TABLE FOR X_n, -, X_{n+2}

X_{n+2} \ X_n	A	E	I	O	U	B	C	D	F	G	H	J	K
A	.0011	.0048	.0029	.0022	.0016	.0004	.0023	.0029	.0009	.0013	.0009	.0000	.0004
E	.0084	.0079	.0081	.0075	.0021	.0012	.0020	.0021	.0015	.0012	.0008	.0000	.0003
I	.0045	.0054	.0033	.0026	.0015	.0007	.0018	.0017	.0010	.0010	.0009	.0000	.0002
O	.0015	.0037	.0007	.0009	.0005	.0004	.0011	.0015	.0015	.0011	.0009	.0000	.0005
U	.0005	.0014	.0012	.0007	.0002	.0006	.0015	.0004	.0006	.0001	.0015	.0000	.0001
B	.0004	.0016	.0002	.0006	.0003	.0001	.0002	.0013	.0001	.0003	.0002	.0001	.0001
C	.0017	.0036	.0008	.0010	.0006	.0007	.0001	.0018	.0011	.0004	.0007	.0001	.0001
D	.0085	.0028	.0013	.0022	.0028	.0002	.0004	.0016	.0004	.0004	.0011	.0001	.0006
F	.0007	.0020	.0003	.0009	.0002	.0002	.0002	.0011	.0005	.0003	.0002	.0000	.0002
G	.0012	.0021	.0060	.0021	.0005	.0003	.0002	.0003	.0002	.0001	.0004	.0000	.0000
H	.0012	.0028	.0035	.0014	.0013	.0000	.0001	.0014	.0003	.0004	.0003	.0001	.0001
J	.0000	.0002	.0000	.0001	.0000	.0000	.0000	.0002	.0000	.0000	.0000	.0000	.0000
K	.0012	.0006	.0009	.0014	.0002	.0000	.0000	.0001	.0000	.0000	.0001	.0000	.0000
L	.0035	.0024	.0023	.0043	.0013	.0007	.0018	.0017	.0017	.0004	.0017	.0000	.0002
M	.0009	.0022	.0006	.0015	.0001	.0000	.0016	.0011	.0004	.0003	.0017	.0001	.0001
N	.0015	.0029	.0047	.0026	.0006	.0007	.0041	.0021	.0006	.0010	.0033	.0001	.0007
P	.0013	.0032	.0007	.0015	.0005	.0000	.0004	.0008	.0003	.0003	.0007	.0000	.0001
Q	.0000	.0001	.0000	.0000	.0000	.0000	.0000	.0001	.0000	.0000	.0000	.0000	.0000
R	.0012	.0038	.0003	.0029	.0004	.0008	.0012	.0016	.0038	.0011	.0031	.0002.	.0003
S	.0039	.0072	.0024	.0051	.0010	.0004	.0014	.0021	.0007	.0012	.0038	.0004	.0003
T	.0043	.0112	.0035	.0051	.0024	.0015	.0007	.0039	.0016	.0034	.0031	.0000	.0004
V	.0002	.0009	.0005	.0003	.0001	.0001	.0001	.0004	.0008	.0004	.0009	.0000	.0000
W	.0004	.0024	.0003	.0004	.0001	.0001	.0001	.0011	.0003	.0003	.0009	.0000	.0002
X	.0000	.0000	.0000	.0000	.0000	.0001	.0000	.0000	.0001	.0000	.0000	.0000	.0000
Y	.0014	.0012	.0010	.0005	.0001	.0003	.0001	.0009	.0003	.0002	.0007	.0000	.0002
Z	.0000	.0000	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
Space	.0161	.0239	.0129	.0164	.0049	.0020	.0045	.0024	.0007	.0026	.0136	.0001	.0011

TABLE XII - Continued

X_{n+2} \ X_n	L	M	N	P	Q	R	S	T	V	W	X	Y	Z	Space
A	.0027	.0011	.0031	.0010	.0003	.0034	.0064	.0050	.0001	.0006	.0001	.0020	.0000	.0186
E	.0021	.0010	.0045	.0022	.0002	.0045	.0034	.0156	.0001	.0010	.0003	.0008	.0000	.0211
I	.0013	.0007	.0031	.0015	.0002	.0025	.0041	.0036	.0001	.0010	.0001	.0009	.0000	.0151
O	.0016	.0005	.0023	.0027	.0000	.0018	.0039	.0065	.0001	.0007	.0001	.0008	.0000	.0288
U	.0004	.0003	.0007	.0002	.0000	.0011	.0013	.0008	.0000	.0006	.0000	.0013	.0000	.0081
B	.0005	.0001	.0006	.0003	.0000	.0011	.0012	.0008	.0000	.0001	.0000	.0005	.0000	.0008
C	.0014	.0007	.0012	.0006	.0000	.0029	.0019	.0021	.0003	.0002	.0001	.0007	.0000	.0012
D	.0012	.0010	.0012	.0005	.0000	.0027	.0016	.0022	.0005	.0003	.0001	.0006	.0001	.0005
F	.0008	.0002	.0007	.0001	.0000	.0010	.0015	.0008	.0000	.0002	.0001	.0009	.0000	.0056
G	.0009	.0004	.0003	.0001	.0000	.0010	.0005	.0006	.0000	.0001	.0000	.0002	.0000	.0003
H	.0005	.0002	.0015	.0002	.0000	.0015	.0014	.0013	.0000	.0002	.0001	.0007	.0000	.0211
J	.0001	.0001	.0001	.0000	.0000	.0002	.0002	.0001	.0000	.0000	.0000	.0001	.0000	.0000
K	.0003	.0005	.0001	.0000	.0000	.0001	.0000	.0002	.0000	.0000	.0000	.0000	.0000	.0001
L	.0002	.0014	.0017	.0011	.0000	.0017	.0018	.0021	.0007	.0010	.0001	.0003	.0000	.0038
M	.0007	.0002	.0010	.0001	.0000	.0025	.0019	.0018	.0001	.0002	.0001	.0005	.0000	.0015
N	.0019	.0034	.0019	.0011	.0000	.0022	.0025	.0028	.0013	.0012	.0001	.0008	.0002	.0162
P	.0006	.0001	.0007	.0002	.0000	.0015	.0012	.0008	.0000	.0001	.0000	.0004	.0000	.0018
Q	.0000	.0000	.0000	.0000	.0000	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0002
R	.0021	.0021	.0030	.0027	.0000	.0005	.0024	.0048	.0023	.0018	.0001	.0005	.0001	.0090
S	.0025	.0019	.0029	.0009	.0000	.0036	.0021	.0022	.0007	.0016	.0001	.0012	.0000	.0031
T	.0025	.0019	.0065	.0008	.0000	.0035	.0038	.0034	.0004	.0016	.0001	.0017	.0001	.0054
V	.0004	.0002	.0004	.0000	.0000	.0009	.0008	.0005	.0001	.0002	.0000	.0001	.0000	.0011
W	.0010	.0002	.0016	.0002	.0000	.0011	.0017	.0010	.0000	.0001	.0000	.0006	.0000	.0016
X	.0000	.0000	.0002	.0000	.0000	.0000	.0004	.0002	.0000	.0000	.0000	.0000	.0000	.0007
Y	.0010	.0003	.0013	.0004	.0000	.0013	.0006	.0011	.0000	.0007	.0002	.0001	.0000	.0021
Z	.0010	.0000	.0002	.0000	.0000	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
Space	.0100	.0027	.0197	.0006	.0000	.0094	.0061	.0123	.0027	.0024	.0001	.0003	.0001	.0084

APPENDIX D. SPANISH POPULATION VALUES (V-2)

1. Yule's 'K' based on the independent occurrence of each character X_n:

Mean value	806.481
Standard Deviation	77.810

2. Yule's 'K' based on the joint occurrence of X_n, X_{n+1}:

Mean value	108.784
Standard Deviation	30.665

3. Yule's 'K' based on the joint occurrence of X_n, -, X_{n+2}:

Mean value	83.553
Standard Deviation	22.886

4. Vowel-Consonant relationships are displayed in Table VI.

TABLE XIII. SPANISH (V-2) INDEPENDENT PROBABILITY OF X_n

X_n	Probability
A	.1053
E	.1088
I	.0573
O	.0771
U	.0339
B	.0114
C	.0372
D	.0390
F	.0060
G	.0092
H	.0072
J	.0034
K	.0005
L	.0471
M	.0236
N	.0620
P	.0205
Q	.0073
R	.0514
S	.0625
T	.0385
V	.0095
W	.0000
X	.0011
Y	.0074
Z	.0031
Space	.1699

TABLE XIV. SPANISH (V-2) JOINT PROBABILITY TABLE FOR X_n, X_{n+1}

X_{n+1} \ X_n	A	E	I	O	U	B	C	D	F	G	H	J	K
A	.0000	.0011	.0076	.0001	.0021	.0036	.0070	.0050	.0006	.0018	.0033	.0008	.0000
E	.0002	.0002	.0071	.0000	.0096	.0008	.0033	.0183	.0010	.0010	.0008	.0009	.0001
I	.0006	.0006	.0000	.0002	.0019	.0022	.0087	.0044	.0017	.0011	.0009	.0001	.0002
O	.0002	.0007	.0068	.0002	.0002	.0008	.0088	.0079	.0010	.0016	.0018	.0012	.0000
U	.0008	.0004	.0001	.0000	.0000	.0005	.0031	.0011	.0009	.0019	.0004	.0004	.0000
B	.0043	.0004	.0011	.0013	.0005	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
C	.0054	.0041	.0046	.0022	.0014	.0000	.0007	.0000	.0000	.0000	.0000	.0000	.0000
D	.0067	.0025	.0035	.0017	.0010	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
F	.0003	.0009	.0005	.0005	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
G	.0005	.0019	.0014	.0007	.0002	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
H	.0002	.0000	.0000	.0000	.0000	.0000	.0023	.0000	.0000	.0000	.0000	.0000	.0000
J	.0006	.0009	.0003	.0003	.0002	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000
K	.0000	.0001	.0000	.0001	.0000	.0000	.0001	.0000	.0000	.0000	.0000	.0000	.0000
L	.0077	.0092	.0032	.0024	.0013	.0012	.0006	.0000	.0003	.0002	.0000	.0000	.0001
M	.0036	.0023	.0027	.0035	.0008	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
N	.0116	.0200	.0063	.0108	.0073	.0000	.0001	.0000	.0000	.0002	.0000	.0000	.0000
P	.0010	.0007	.0003	.0009	.0005	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
Q	.0004	.0002	.0001	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
R	.0114	.0107	.0018	.0067	.0020	.0017	.0006	.0007	.0005	.0015	.0000	.0000	.0000
S	.0104	.0155	.0033	.0152	.0021	.0003	.0000	.0000	.0000	.0000	.0000	.0000	.0001
T	.0025	.0025	.0023	.0014	.0007	.0001	.0019	.0000	.0000	.0000	.0000	.0000	.0000
V	.0006	.0010	.0016	.0015	.0002	.0000	.0000	.0001	.0000	.0000	.0000	.0000	.0000
W	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
X	.0000	.0010	.0000	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
Y	.0006	.0002	.0000	.0003	.0004	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
Z	.0006	.0010	.0005	.0001	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
Space	.0352	.0311	.0022	.0268	.0013	.0000	.0000	.0014	.0000	.0000	.0000	.0000	.0001

TABLE XIV - Continued

X_{n+1} \ X_n	L	M	N	P	Q	R	S	T	V	W	X	Y	Z	Space
A	.0133	.0050	.0072	.0052	.0000	.0103	.0034	.0093	.0019	.0000	.0001	.0006	.0014	.0146
E	.0050	.0057	.0031	.0034	.0000	.0085	.0073	.0096	.0032	.0000	.0000	.0003	.0000	.0196
I	.0039	.0041	.0030	.0013	.0000	.0059	.0045	.0054	.0032	.0000	.0003	.0000	.0000	.0032
O	.0075	.0035	.0062	.0041	.0000	.0072	.0042	.0075	.0010	.0000	.0000	.0006	.0007	.0034
U	.0007	.0015	.0016	.0014	.0072	.0011	.0030	.0016	.0001	.0000	.0000	.0001	.0001	.0058
B	.0001	.0012	.0000	.0000	.0000	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0022
C	.0002	.0000	.0032	.0000	.0000	.0008	.0012	.0000	.0000	.0000	.0001	.0000	.0001	.0134
D	.0002	.0000	.0031	.0000	.0000	.0010	.0002	.0000	.0000	.0000	.0000	.0000	.0000	.0193
F	.0001	.0000	.0006	.0000	.0000	.0000	.0002	.0000	.0000	.0000	.0000	.0000	.0000	.0028
G	.0005	.0000	.0008	.0000	.0000	.0009	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0021
H	.0000	.0000	.0000	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0045
J	.0000	.0000	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0010
K	.0000	.0000	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0001
L	.0028	.0000	.0000	.0015	.0000	.0006	.0002	.0000	.0000	.0000	.0000	.0000	.0000	.0159
M	.0004	.0000	.0001	.0000	.0000	.0018	.0006	.0000	.0000	.0000	.0000	.0000	.0000	.0078
N	.0000	.0000	.0003	.0000	.0000	.0004	.0000	.0000	.0000	.0000	.0000	.0001	.0000	.0049
P	.0001	.0025	.0000	.0000	.0000	.0002	.0017	.0000	.0000	.0000	.0003	.0000	.0000	.0123
Q	.0000	.0000	.0004	.0000	.0000	.0002	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0057
R	.0001	.0000	.0000	.0032	.0000	.0014	.0000	.0050	.0000	.0000	.0000	.0000	.0000	.0039
S	.0003	.0000	.0017	.0000	.0000	.0013	.0000	.0000	.0000	.0000	.0000	,0000	.0000	.0124
T	.0008	.0000	.0116	.0001	.0000	.0020	.0065	.0000	.0000	.0000	.0002	.0000	.0000	.0061
V	.0004	.0000	.0006	.0000	.0000	.0005	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0031
W	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
X	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
Y	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0058
Z	.0000	.0000	.0005	.0000	.0000	.0002	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0001
Space	.0106	.0000	.0178	.0001	.0000	.0071	.0295	.0001	.0001	.0000	.0000	.0058	.0007	n/c

TABLE XV. SPANISH (V-2) JOINT PROBABILITY TABLE FOR X_n, -, X_{n+2}

X_{n+2} \ X_n	A	E	I	O	U	B	C	D	F	G	H	J	K
A	.0123	.0095	.0086	.0074	.0054	.0016	.0047	.0013	.0004	.0012	.0000	.0001	.0000
E	.0102	.0090	.0031	.0078	.0016	.0024	.0026	.0013	.0010	.0010	.0001	.0001	.0000
I	.0092	.0074	.0049	.0051	.0019	.0008	.0022	.0003	.0002	.0007	.0000	.0000	.0000
O	.0088	.0059	.0052	.0045	.0027	.0004	.0043	.0008	.0001	.0008	.0000	.0000	.0001
U	.0032	.0029	.0014	.0018	.0003	.0001	.0007	.0000	.0001	.0001	.0000	.0000	.0000
B	.0011	.0007	.0002	.0008	.0001	.0001	.0005	.0004	.0001	.0000	.0013	.0001	.0000
C	.0042	.0051	.0011	.0021	.0011	.0002	.0004	.0015	.0012	.0002	.0010	.0001	.0000
D	.0056	.0037	.0009	.0051	.0012	.0002	.0012	.0020	.0000	.0003	.0001	.0001	.0000
F	.0008	.0007	.0003	.0005	.0001	.0000	.0001	.0004	.0000	.0000	.0000	.0001	.0000
G	.0016	.0007	.0004	.0008	.0005	.0000	.0001	.0000	.0001	.0000	.0001	.0000	.0000
H	.0011	.0014	.0001	.0014	.0006	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
J	.0002	.0002	.0002	.0002	.0000	.0003	.0000	.0003	.0000	.0000	.0001	.0000	.0000
K	.0001	.0001	.0000	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
L	.0049	.0059	.0025	.0022	.0012	.0004	.0019	.0021	.0002	.0003	.0003	.0000	.0001
M	.0029	.0024	.0016	.0018	.0003	.0001	.0028	.0007	.0001	.0001	.0007	.0002	.0000
N	.0015	.0020	.0082	.0010	.0016	.0008	.0056	.0018	.0008	.0013	.0005	.0003	.0000
P	.0030	.0045	.0009	.0025	.0004	.0000	.0007	.0002	.0000	.0000	.0000	.0000	.0000
Q	.0015	.0010	.0002	.0015	.0002	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
R	.0029	.0028	.0019	.0020	.0016	.0010	.0027	.0022	.0009	.0011	.0006	.0004	.0000
S	.0033	.0039	.0026	.0029	.0015	.0004	.0025	.0044	.0003	.0005	.0008	.0005	.0000
T	.0061	.0133	.0028	.0029	.0019	.0004	.0004	.0006	.0002	.0003	.0000	.0001	.0000
V	.0012	.0013	.0004	.0007	.0005	.0000	.0001	.0004	.0000	.0000	.0000	.0004	.0000
W	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
X	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
Y	.0015	.0008	.0001	.0010	.0000	.0000	.0001	.0001	.0000	.0000	.0002	.0000	.0001
Z	.0004	.0003	.0004	.0000	.0001	.0000	.0001	.0000	.0000	.0000	.0002	.0000	.0000
Space	.0176	.0235	.0095	.0210	.0094	.0019	.0036	.0181	.0002	.0013	.0011	.0008	.0001

TABLE XV - Continued

X_{n+2} \ X_n	L	M	N	P	Q	R	S	T	V	W	X	Y	Z	Space
A	.0032	.0008	.0061	.0011	.0000	.0055	.0064	.0026	.0004	.0000	.0000	.0005	.0001	.0263
E	.0023	.0012	.0100	.0028	.0060	.0048	.0054	.0018	.0008	.0000	.0001	.0006	.0001	.0326
I	.0010	.0008	.0040	.0012	.0012	.0024	.0018	.0005	.0002	.0000	.0000	.0000	.0000	.0116
O	.0017	.0007	.0060	.0016	.0000	.0039	.0032	.0017	.0004	.0000	.0000	.0002	.0002	.0239
U	.0005	.0001	.0024	.0002	.0000	.0009	.0018	.0003	.0000	.0000	.0000	.0002	.0000	.0171
B	.0011	.0001	.0004	.0002	.0000	.0012	.0009	.0008	.0001	.0000	.0000	.0001	.0001	.0009
C	.0029	.0008	.0032	.0012	.0000	.0028	.0029	.0021	.0007	.0000	.0000	.0005	.0001	.0018
D	.0020	.0012	.0026	.0009	.0000	.0019	.0054	.0025	.0006	.0000	.0000	.0006	.0002	.0010
F	.0045	.0000	.0004	.0000	.0000	.0006	.0006	.0003	.0000	.0000	.0000	.0001	.0000	.0006
G	.0011	.0002	.0004	.0000	.0000	.0010	.0010	.0005	.0001	.0000	.0000	.0001	.0000	.0004
H	.0003	.0000	.0005	.0000	.0000	.0002	.0008	.0000	.0000	.0000	.0000	.0002	.0000	.0007
J	.0003	.0003	.0002	.0000	.0000	.0003	.0004	.0001	.0000	.0000	.0000	.0000	.0000	.0003
K	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
L	.0005	.0022	.0032	.0009	.0000	.0017	.0035	.0015	.0006	.0000	.0002	.0007	.0001	.0100
M	.0016	.0002	.0014	.0000	.0000	.0016	.0016	.0015	.0002	.0000	.0002	.0004	.0001	.0013
N	.0020.	.0053	.0014	.0011	.0000	.0034	.0033	.0033	.0010	.0000	.0001	.0004	.0003	.0152
P	.0014	.0000	.0010	.0000	.0000	.0014	.0029	.0001	.0000	.0000	.0000	.0003	.0001	.0008
Q	.0003	.0001	.0005	.0000	.0000	.0004	.0010	.0000	.0001	.0000	.0000	.0001	.0001	.0004
R	.0018	.0023	.0033	.0064	.0000	.0009	.0032	.0036	.0013	.0000	.0002	.0004	.0002	.0076
S	.0083	.0027	.0052	.0013	.0000	.0056	.0042	.0036	.0011	.0000	.0001	.0008	.0004	.0056
T	.0014	.0010	.0016	.0004	.0000	.0015	.0016	.0005	.0001	.0000	.0000	.0002	.0000	.0011
V	.0007	.0002	.0008	.0000	.0000	.0005	.0011	.0008	.0001	.0000	.0000	.0000	.0000	.0003
W	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
X	.0000	.0000	.0000	.0000	.0000	.0001	.0000	.0001	.0000	.0000	.0000	.0000	.0000	.0009
Y	.0003	.0005	.0004	.0001	.0000	.0004	.0015	.0001	.0000	.0000	.0000	.0001	.0002	.0001
Z	.0003	.0000	.0001	.0001	.0000	.0004	.0000	.0001	.0003	.0000	.0000	.0000	.0000	.0001
Space	.0117	.0031	.0071	.0010	.0000	.0082	.0076	.0103	.0014	.0000	.0000	.0010	.0010	.0095

APPENDIX E. TABLE XVI - Significance Levels for Kolmogorov-Smirnov Test

z	α	z	α	z	α	z	α	z	α
0.28	.999999	0.59	.877240	0.90	.392730	1.21	.106970	1.52	.019690
0.29	.999996	0.60	.864282	0.91	.379072	1.22	.101896	1.53	.018524
0.30	.999991	0.61	.850771	0.92	.365714	1.23	.097028	1.54	.017422
0.31	.999979	0.62	.836775	0.93	.352662	1.24	.092352	1.55	.016378
0.32	.999954	0.63	.822247	0.94	.339918	1.25	.087868	1.56	.015390
0.33	.999909	0.64	.807333	0.95	.327484	1.26	.083568	1.57	.014456
0.34	.999829	0.65	.792013	0.96	.315364	1.27	.079444	1.58	.013574
0.35	.999697	0.66	.776363	0.97	.303556	1.28	.075495	1.59	.012740
0.36	.999489	0.67	.760418	0.98	.292060	1.29	.071712	1.60	.011952
0.37	.999174	0.68	.744220	0.99	.280874	1.30	.068092	1.61	.011209
0.38	.998715	0.69	.727811	1.00	.270000	1.31	.064630	1.62	.010508
0.39	.998071	0.70	.711235	1.01	.259434	1.32	.061318	1.63	.009846
0.40	.997192	0.71	.694529	1.02	.249174	1.33	.058152	1.64	.009223
0.41	.996028	0.72	.677735	1.03	.239220	1.34	.055128	1.65	.008636
0.42	.994524	0.73	.660887	1.04	.229566	1.35	.052244	1.66	.008083
0.43	.992623	0.74	.644019	1.05	.220206	1.36	.049488	1.67	.007562
0.44	.990270	0.75	.627167	1.06	.211140	1.37	.046858	1.68	.007072
0.45	.987410	0.76	.610360	1.07	.202364	1.38	.044350	1.69	.006611
0.46	.983995	0.77	.593628	1.08	.193872	1.39	.041960	1.70	.006177
0.47	.979978	0.78	.576998	1.09	.185658	1.40	.039682	1.71	.005770
0.48	.975318	0.79	.560495	1.10	.177718	1.41	.037514	1.72	.005388
0.49	.969983	0.80	.544143	1.11	.170050	1.42	.035448	1.73	.005028
0.50	.963645	0.81	.527959	1.12	.162644	1.43	.033484	1.74	.004691
0.51	.957186	0.82	.511970	1.13	.155498	1.44	.031618	1.75	.004375
0.52	.949694	0.83	.496192	1.14	.148606	1.45	.029842	1.76	.004078
0.53	.941466	0.84	.480634	1.15	.141962	1.46	.028154	1.77	.003800
0.54	.932503	0.85	.465318	1.16	.135558	1.47	.026552	1.78	.003540
0.55	.922817	0.86	.450256	1.17	.129388	1.48	.025030	1.79	.003296
0.56	.912423	0.87	.435454	1.18	.123452	1.49	.023588	1.80	.003068
0.57	.901344	0.88	.420930	1.19	.117742	1.50	.022218	1.81	.002845
0.58	.889605	0.89	.406684	1.20	.112250	1.51	.020920	1.82	.002645

APPENDIX F. FINAL TEST SOURCES

From Introduction to Literature: Stories [Ref. 10]:

Anderson, Sherwood, Death in the Woods.

Benét, Stephen Vincent, By The Waters of Babylon.

Crane, Stephen, The Open Boat.

Curley, Daniel, A Story of Love, Etc.

Edmonds, Walter D., Death of Red Peril.

Fitzgerald, F. Scott, Absolution.

Forster, E. M., The Other Side of the Hedge.

Galsworthy, John, Quality.

Hardy, Thomas, The Three Strangers.

Porter, Katherine Anne, The Grave.

Schwartz, Delmore, In Dreams Begin Responsibilities.

Steele, Wilbur Daniel, Footfalls.

Steinbeck, John, from The Red Pony: The Gift.

Stevenson, Robert Louis, Markheim.

White, E. B., The Dove.

From Five Centuries of Spanish Literature [Ref. 11]:

Anonymous, Lazarillo de Tormes.

Cervantes Saavedra, Miguel De, El igenioso hidalgo, don Quijote de la Mancha.

Manuel, Don Juan, El Conde Lucanor.

From Antología Venezolana [Ref. 12]:

Alfonzo, Alfredo Armas, La hora y punto.

Arráiz, Antonio, El mar es como un potro vigoroso.

Coll, Pedro Emilio, El diente roto.

Croce, Arturo, Angustia apagada.

Diaz Rodríguez, Manuel, Mi Alma era una mina abandonada.

Diaz Sanchez, Ramon, Poderes de la mas alta valia.

Diaz Solis, Gustavo, La efigie.

Fombona, Rufino Blanco, El catire.

Gallegos, Romulo, Canaima.

Garmendia, Julio, Eladia.

Guaramato, Oscar, Vecindad.

La Parra, Teresa De, Vicente Cochocho.

Marquez Salas, Antonio, Como Dios!.

Meneses, Guillermo, El compañero Juan Ruiz.

Mujica, Hector, Las tres ventanas.

Núñez, Enrique Bernardo, Vocchi.

Palacios, Lucila, Cap. XX (Cubil).

Picon Salas, Mariano, Josefita.

Pocaterra, Jose Rafael, Patria, la mestiza.

Pardo, Isaac J., El domador de potros.

Pardon, Julian, II(Primavera nocturna).

Rivas Mijares, Humberto, El murado.

Rosales, Julio, El mejor rabula.

Ruiz, Jose Fabbiani, A orillas del viejo rio.

Silva, Miguel Otero, Fiebre.

Stolk, Gloria, Cap. I (Amargo fondo).

Urbaneja Achelpohl, Luis M., Ovejon...!.

Uslar Pietri, Arturo, X (Las lanzas coloradas).

From An Anthology of Spanish American Literature [Ref. 13]:

Altamirano, Ignacio Manuel, El dia de muertos.

Bastamente Carlos Inga, Calixto (Concolorcorvo), El lazarillo de ciegos caminantes.

Bello, Andres, Silva a la Argicultura de la Zona Torrida.

Blanco-Fombona, Rufino, El conquistador español del siglo XVI.

Bolivar, Simon, Carta a un caballero que tomaba gran interes en la causa republicana en la america del sur.

Chocano, Jose Santos, La Epopeya Del Pacifico.

Cortes, Hernan, The Death of Moctezuma and the Tragic Retreat of the Spaniards from the Aztec Capital the Night of June 30, 1520.

Dario, Ruben, Azul (El rey burgues).

Diaz del Castillo, Bernal, The Imprisonment of Moctezuma.

Fernandez de Lizardi, Jose Joaquin, El periquillo sarniento.

Garcia Calderon, Francisco, La creacion de un continente.

Garcilaso de la Vega, El Inca, Comentarios reales de los incas.

Gonzalez Prada, Manuel, Discurso en el politeama.

Gutierrez Najera, Manuel, La Novela Del Tranvia.

Hernandez, Jose, Martin Fierro.

Juana Ines de la Cruz, Sor, Respuesta a Sor Filotea de la Cruz.

Latorre, Mariano, Chilenos del mar (El piloto Oyarzo).

Lillo, Baldomero, El chiflon del diablo.

Lopez Albujar, Enrique, Cuentos andinos (Como habla la coca).

Marti, Jose, Nuestra America.

Mitre, Bartolome, La historia de San Martin.

Montalvo, Juan, Washington y Bolivar.

Nervo, Amado, Una esperanza.

Palma, Ricardo, Las orejas del Alcalde.

Quiroga, Horacio, El desierto.

Reyes, Alfonso, Vision de Anahuac.

Rodo, Jose Enrique, Ariel.

Rojas, Manuel, Hombres del sur (El cachorro).

Rojas, Ricardo, La argentinidad.

Sarmiento, Domingo Faustino, Facundo.

Siguenza y Gongora, Carlos de, Infortunios de Alonso Rameriz.

Ugarte, Manuel, El destino de un continente (La neuva Roma).

Vasconcelos, Jose, La raza cosmica.

Viana, Javier de, Leña seca (El domador).

From The Creative Reader [Ref. 14]:

Algren, Nelson, The Moon of the Arfy Darfy.

Amster, L. J., Center of Gravity.

Auchincloss, Louis, Power in Trust.

Berriault, Gina, The Birthday Party.

Boyle, Kay, The Ballet of Central Park.

Buechler, James, John Sobieski Runs.

Calisher, Hortense, Little Did I Know.

Connell, Evan S., Jr., The Suicide.

Cozzens, James Gould, One Hundred Ladies.

Elkin, Stanley, Perlmutter at the East Pole.

Gary, Romain, A Humanist.

Gold, Hebert, Dance of the Divorced.

Goyen, William, Figure over the Town.

Greene, Graham, The Root of All Evil.

Malamud, Bernard, The Refugee.

McCullers, Carson, Sucker.

Miller, Warren, Chaos, Disorder and the Late Show.

Moravia, Alberto, A Tough Nut.

O'Connor, Frank, A Life of Your Own.

O'Faolain, Sean, One Man, One Boat, One Girl.

Pynchon, Thomas, The Secret Integration.

Saroyan, William, Boys and Girls Together.

Seager, Allan, No More Roses.

Shaw, Irwin, The Inhabitants of Venus.

Singer, Isaac Bashevis, Esther Kreindel The Second.

Swados, Harvey, A Story For Teddy.

Updike, John, The Lucid Eye in Silver Town.

White, Robin, Walker's Peak.

Williams, Thomas, The Old Dancers.

Wood, Malcolm, The Appraiser.

From Best Modern Short Stories [Ref. 15]:

Aiken, Conrad, Mr. Arcularis.

Audry, Colette, The Gloves.

Bierce, Ambrose, An Occurrence at Owl Creek Bridge.

Bowen, Elizabeth, The Demon Lover.

Conrad, Hoseph, Amy Foster.

Faulkner, William, A Rose For Emily.

Granberry, Edwin, A Trip to Czardis.

Hawthorne, Nathaniel, My Kinsman, Major Molineux.

Hemingway, Ernest, A Clean, Well-Lighted Place.

James, Henry, Paste.

Joyce, James, A Little Cloud.

Lawrence, D. H., The Horse Dealer's Daughter.

Lowry, Malcolm, Strange Comfort Afforded by the Profession.

Mansfield, Katherine, The Fly.

Maupassant, Guy de, Two Friends.

Poe, Edgar Allan, Ligeia.

Taylor, Elizabeth, The First Death of Her Life.

Thurber, James, The Catbird Seat.

Welty, A Still Moment.

West, Jessamyn, Sixteen.

APPENDIX G. POPULATION ANALYSIS PROGRAM (V-1)

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000050 IDENTIFICATION DIVISION.                                        ANAL-ONE
000100 PROGRAM-ID.  V1-LANGUAGE-ANALYSIS.                               ANAL-ONE
000150 AUTHOR. LCDR. MORTON D. RAU, USN.                                ANAL-ONE
000200 REMARKS.  THIS PROGRAM IS PART OF MY MASTER OF SCIENCE IN        ANAL-ONE
000250     MANAGEMENT THESIS AND IS DESIGNED TO CALCULATE VARIOUS       ANAL-ONE
000300     STATISTICAL CHARACTERISTICS FOR LETTERS APPEARING IN         ANAL-ONE
000350     LANGUAGES WRITTEN IN THE MODERN LATIN ALPHABET.              ANAL-ONE
000400 ENVIRONMENT DIVISION.                                             ANAL-ONE
000450 CONFIGURATION SECTION.                                            ANAL-ONE
000500 SOURCE-COMPUTER.  IBM-360-67.                                     ANAL-ONE
000550 OBJECT-COMPUTER.  IBM-360-67.                                     ANAL-ONE
000600 SPECIAL-NAMES.                                                    ANAL-ONE
000650     C01 IS TOP-OF-PAGE.                                          ANAL-ONE
000700 INPUT-OUTPUT SECTION.                                             ANAL-ONE
000750 FILE-CONTROL.                                                     ANAL-ONE
000800     SELECT POPULATION ASSIGN TO UR-S-IN1.                        ANAL-ONE
000850     SELECT LANG-ANAL ASSIGN TO UR-S-OUT1.                        ANAL-ONE
000900     SELECT CARD-FILE ASSIGN TO UR-S-OUT2.                        ANAL-ONE
000950 DATA DIVISION.                                                   ANAL-ONE
001000 FILE SECTION.                                                    ANAL-ONE
001050 FD  POPULATION                                                   ANAL-ONE
001100     LABEL RECORDS ARE OMITTED BLOCK CONTAINS 5 RECORDS           ANAL-ONE
001150     DATA RECORD IS POP-CARD, LANG-CARD.                          ANAL-ONE
001200 01  POP-CARD.                                                    ANAL-ONE
001250     05  FILLER PIC XX.                                           ANAL-ONE
001300     05  SAMPLE-FLD.                                              ANAL-ONE
001350         10  CB PIC X, OCCURS 71 TIMES.                           ANAL-ONE
001400     05  FILLER PIC X(7).                                         ANAL-ONE
001450 01  LANG-CARD.                                                   ANAL-ONE
001500     05  CARD-TYPE PIC A.                                         ANAL-ONE
001550         88  NEW-LANG VALUE 'L'.                                  ANAL-ONE
001600     05  FILLER PIC X.                                            ANAL-ONE
001650     05  LANGUAGE PIC X(30).                                      ANAL-ONE
001700     05  FILLER PIC X(38).                                        ANAL-ONE
001750     05  LANG-KEY PIC X(10).                                      ANAL-ONE
001800 FD  LANG-ANAL                                                    ANAL-ONE
001850     LABEL RECORDS ARE OMITTED BLOCK CONTAINS 5 RECORDS           ANAL-ONE
001900     DATA RECORD IS PRINT-LINE.                                   ANAL-ONE
001950 01  PRINT-LINE  PIC X(133).                                      ANAL-ONE
002000 FD  CARD-FILE                                                    ANAL-ONE
002050     LABEL RECORDS ARE OMITTED RECORD CONTAINS 80 CHARACTERS      ANAL-ONE
002100     DATA RECORD IS CARD-OUT.                                     ANAL-ONE
002150 01  CARD-OUT  PIC X(80).                                         ANAL-ONE
002200 WORKING-STORAGE SECTION.                                          ANAL-ONE
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002250 77   VC-TOTAL PIC 9(8) VALUE ZEROS.                                ANAL-ONE
002300 77   A PIC 99, COMP, SYNC.                                         ANAL-ONE
002350 77   B PIC 99, COMP, SYNC.                                         ANAL-ONE
002400 77   N PIC 99, COMP, SYNC.                                         ANAL-ONE
002450 77   F-CONS-CONS PIC 9(7), COMP, SYNC, VALUE ZEROS.                ANAL-ONE
002500 77   F-VOW-CONS PIC 9(7), COMP, SYNC, VALUE ZEROS.                 ANAL-ONE
002550 77   F-CONS-VOW PIC 9(7), COMP, SYNC, VALUE ZEROS.                 ANAL-ONE
002600 77   F-VOW-VOW  PIC 9(7), COMP, SYNC, VALUE ZEROS.                 ANAL-ONE
002650 77   FOL-FREQ-TOTAL PIC 9(8), COMP, SYNC.                          ANAL-ONE
002700 77   S PIC 9(12), COMP, SYNC.                                      ANAL-ONE
002750 77   ILF-TOTAL PIC 9(8), COMP, SYNC.                               ANAL-ONE
002800 77   CRF-TOTAL PIC 9V9(5), COMP-3.                                 ANAL-ONE
002850 77   CARD-NR PIC 9(6), COMP-3, VALUE ZEROS.                        ANAL-ONE
002900 77   L PIC 99, COMP, SYNC.                                         ANAL-ONE
002950 77   M PIC 99, COMP, SYNC.                                         ANAL-ONE
003000 77   X PIC 99, COMP, SYNC.                                         ANAL-ONE
003050 77   Y PIC 99, COMP, SYNC.                                         ANAL-ONE
003100 77   WS-SEQ-NR PIC 999.                                            ANAL-ONE
003150 01   LTR-TABLE-VALUES.                                             ANAL-ONE
003200       05  FILLER PIC X VALUE 'A'.                                  ANAL-ONE
003250       05  FILLER PIC X VALUE 'E'.                                  ANAL-ONE
003300       05  FILLER PIC X VALUE 'I'.                                  ANAL-ONE
003350       05  FILLER PIC X VALUE 'O'.                                  ANAL-ONE
003400       05  FILLER PIC X VALUE 'U'.                                  ANAL-ONE
003450       05  FILLER PIC X VALUE '1'.                                  ANAL-ONE
003500       05  FILLER PIC X VALUE '2'.                                  ANAL-ONE
003550       05  FILLER PIC X VALUE '3'.                                  ANAL-ONE
003600       05  FILLER PIC X VALUE '4'.                                  ANAL-ONE
003650       05  FILLER PIC X VALUE '5'.                                  ANAL-ONE
003700       05  FILLER PIC X VALUE 'B'.                                  ANAL-ONE
003750       05  FILLER PIC X VALUE 'C'.                                  ANAL-ONE
003800       05  FILLER PIC X VALUE 'D'.                                  ANAL-ONE
003850       05  FILLER PIC X VALUE 'F'.                                  ANAL-ONE
003900       05  FILLER PIC X VALUE 'G'.                                  ANAL-ONE
003950       05  FILLER PIC X VALUE 'H'.                                  ANAL-ONE
004000       05  FILLER PIC X VALUE 'J'.                                  ANAL-ONE
004050       05  FILLER PIC X VALUE 'K'.                                  ANAL-ONE
004100       05  FILLER PIC X VALUE 'L'.                                  ANAL-ONE
004150       05  FILLER PIC X VALUE 'M'.                                  ANAL-ONE
004200       05  FILLER PIC X VALUE 'N'.                                  ANAL-ONE
004250       05  FILLER PIC X VALUE 'P'.                                  ANAL-ONE
004300       05  FILLER PIC X VALUE 'Q'.                                  ANAL-ONE
004350       05  FILLER PIC X VALUE 'R'.                                  ANAL-ONE
004400       05  FILLER PIC X VALUE 'S'.                                  ANAL-ONE
004450       05  FILLER PIC X VALUE 'T'.                                  ANAL-ONE
004500       05  FILLER PIC X VALUE 'V'.                                  ANAL-ONE
004550       05  FILLER PIC X VALUE 'W'.                                  ANAL-ONE
004600       05  FILLER PIC X VALUE 'X'.                                  ANAL-ONE
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004650      05  FILLER PIC X VALUE 'Y'.                                  ANAL-ONE
004700      05  FILLER PIC X VALUE 'Z'.                                  ANAL-ONE
004750      05  FILLER PIC X VALUE '6'.                                  ANAL-ONE
004800      05  FILLER PIC X VALUE '7'.                                  ANAL-ONE
004850 01  LTR-TABLE REDEFINES LTR-TABLE-VALUES.                         ANAL-ONE
004900      05  LTR PIC X, OCCURS 33 TIMES.                              ANAL-ONE
004950 01  IND-FREQ-TABLE.                                               ANAL-ONE
005000      05  ILF  PIC 9(6), COMP, SYNC, OCCURS 33 TIMES.              ANAL-ONE
005050 01  IND-PROB-TABLE.                                               ANAL-ONE
005100      05  ILP  PIC 9V9(5), COMP, SYNC, OCCURS 33 TIMES.            ANAL-ONE
005150 01  DEPENDENCY-FREQ-TABLE.                                        ANAL-ONE
005200      05  FST-LTR OCCURS 33 TIMES.                                 ANAL-ONE
005250          10  FOL-FREQ  PIC 9(6), COMP, SYNC, OCCURS 66 TIMES.     ANAL-ONE
005300 01  DEPENDENCY-PROB-TABLE.                                        ANAL-ONE
005350      05  GIVEN-LTR  OCCURS 33 TIMES.                              ANAL-ONE
005400          10  FOL-PROB  PIC 9V9(5), COMP, SYNC, OCCURS 66 TIMES.   ANAL-ONE
005450 01  OUTPT-ONE-A.                                                  ANAL-ONE
005500      05  FILLER PIC X(43) VALUE SPACES.                           ANAL-ONE
005550      05  FILLER PIC X(48) VALUE 'FREQUENCY/INDEPENDENT PROBABILITYANAL-ONE
005600-     ' OF EACH LETTER'.                                            ANAL-ONE
005650      05  FILLER PIC X(42) VALUE SPACES.                           ANAL-ONE
005700 01  LANG-LINE.                                                    ANAL-ONE
005750      05  FILLER PIC X(54) VALUE SPACES.                           ANAL-ONE
005800      05  FILLER PIC X(11) VALUE 'LANGUAGE:'.                      ANAL-ONE
005850      05  LANG-DESIG PIC X(30).                                    ANAL-ONE
005900      05  FILLER PIC X(38) VALUE SPACES.                           ANAL-ONE
005950 01  OUTPT-ONE-C.                                                  ANAL-ONE
006000      05  FILLER PIC X(37) VALUE SPACES.                           ANAL-ONE
006050      05  FILLER PIC X(25) VALUE 'LETTER'.                         ANAL-ONE
006100      05  FILLER PIC X(25) VALUE 'FREQUENCY'.                      ANAL-ONE
006150      05  FILLER PIC X(46) VALUE 'PROBABILITY'.                    ANAL-ONE
006200 01  OUTPT-ONE-B.                                                  ANAL-ONE
006250      05  FILLER PIC X(43) VALUE SPACES.                           ANAL-ONE
006300      05  FILLER PIC X(48) VALUE ALL '_'.                          ANAL-ONE
006350      05  FILLER PIC X(42) VALUE SPACES.                           ANAL-ONE
006400 01  LANG-UNDERLINE.                                               ANAL-ONE
006450      05  FILLER PIC X(65) VALUE SPACES.                           ANAL-ONE
006500      05  FILLER PIC X(30) VALUE ALL '_'.                          ANAL-ONE
006550      05  FILLER PIC X(38) VALUE SPACES.                           ANAL-ONE
006600 01  OUTPT-ONE-D.                                                  ANAL-ONE
006650      05  FILLER PIC X(37) VALUE SPACES.                           ANAL-ONE
006700      05  FILLER PIC X(61) VALUE ALL '_'.                          ANAL-ONE
006750      05  FILLER PIC X(35) VALUE SPACES.                           ANAL-ONE
006800 01  OUTPT-ONE-E.                                                  ANAL-ONE
006850      05  FILLER PIC X(40) VALUE SPACES.                           ANAL-ONE
006900      05  LTR-ONE PIC X.                                           ANAL-ONE
006950      05  FILLER PIC X(22) VALUE SPACES.                           ANAL-ONE
007000      05  FREQ-ONE PIC ZZZ,ZZ9.                                    ANAL-ONE
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007050      05  FILLER PIC X(19) VALUE SPACES.                          ANAL-ONE
007100      05  PROB-ONE PIC 9.99999.                                   ANAL-ONE
007150      05  FILLER PIC X(37) VALUE SPACES.                          ANAL-ONE
007200 01   OUTPT-ONE-F.                                                ANAL-ONE
007250      05  FILLER PIC X(38) VALUE SPACES.                          ANAL-ONE
007300      05  FILLER PIC X(22) VALUE 'TOTAL'.                         ANAL-ONE
007350      05  ONE-F-ILF-TLT PIC ZZ,ZZZ,ZZ9.                           ANAL-ONE
007400      05  FILLER PIC X(63) VALUE SPACES.                          ANAL-ONE
007450 01   OUTPT-TWO-A.                                                ANAL-ONE
007500      05  FILLER PIC X(46) VALUE SPACES.                          ANAL-ONE
007550      05  FILLER PIC X(87) VALUE 'FREQUENCY AND PROBABILITY OF (X(2ANAL-ONE
007600-     ')/X(1))'.                                                   ANAL-ONE
007650 01   OUTPT-TWO-THREE-B.                                          ANAL-ONE
007700      05  FILLER PIC X(46) VALUE SPACES.                          ANAL-ONE
007750      05  FILLER PIC X(40) VALUE ALL '_'.                         ANAL-ONE
007800      05  FILLER PIC X(47) VALUE SPACES.                          ANAL-ONE
007850 01   FIRST-LTR-OUTPT.                                            ANAL-ONE
007900      05  FILLER PIC X(31) VALUE SPACES.                          ANAL-ONE
007950      05  FILLER PIC X(102) VALUE '**********FIRST LETTER, X(1)****ANAL-ONE
008000-     '******'.                                                    ANAL-ONE
008050 01   FIRST-LTR-TITLES.                                           ANAL-ONE
008100      05  FILLER PIC X(14) VALUE SPACES.                          ANAL-ONE
008150      05  FIRST-LTR PIC X(9), OCCURS 13 TIMES.                    ANAL-ONE
008200      05  FILLER PIC XX VALUE SPACES.                             ANAL-ONE
008250 01   DEPN-FREQ-LINE.                                             ANAL-ONE
008300      05  FILLER PIC X(5) VALUE SPACES.                           ANAL-ONE
008350      05  FREQ-ROW-LTR PIC X.                                     ANAL-ONE
008400      05  FILLER PIC XXX VALUE '(F)'.                             ANAL-ONE
008450      05  DEPN-FREQ PIC BBZZZ,ZZ9  OCCURS 13 TIMES.               ANAL-ONE
008500      05  FILLER PIC X(7) VALUE SPACES.                           ANAL-ONE
008550 01   DEPN-PROB-LINE.                                             ANAL-ONE
008600      05  FILLER PIC X(5) VALUE SPACES.                           ANAL-ONE
008650      05  PROB-ROW-LTR PIC X.                                     ANAL-ONE
008700      05  FILLER PIC XXX VALUE '(P)'.                             ANAL-ONE
008750      05  DEPN-PROB PIC BB9.99999  OCCURS 13 TIMES.               ANAL-ONE
008800      05  FILLER PIC X(7) VALUE SPACES.                           ANAL-ONE
008850 01   OUTPT-THREE-A.                                              ANAL-ONE
008900      05  FILLER PIC X(46) VALUE SPACES.                          ANAL-ONE
008950      05  FILLER PIC X(87) VALUE 'FREQUENCY AND PROBABILITY OF (X(3ANAL-ONE
009000-     ')/X(1))'.                                                   ANAL-ONE
009050 01   OUTPT-FOUR-A.                                               ANAL-ONE
009100      05  FILLER PIC X(47) VALUE SPACES.                          ANAL-ONE
009150      05  FILLER PIC X(33) VALUE 'P(VOWEL/VOWEL)'.                ANAL-ONE
009200      05  P-VOW-VOW  PIC 9.99999.                                 ANAL-ONE
009250      05  FILLER PIC X(46) VALUE SPACES.                          ANAL-ONE
009300 01   OUTPT-FOUR-B.                                               ANAL-ONE
009350      05  FILLER PIC X(47) VALUE SPACES.                          ANAL-ONE
009400      05  FILLER PIC X(33) VALUE 'P(CONSONANT/VOWEL)'.            ANAL-ONE
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009450      05  P-CONS-VOW  PIC 9.99999.                                ANAL-ONE
009500      05  FILLER PIC X(46) VALUE SPACES.                          ANAL-ONE
009550 01  OUTPT-FOUR-C.                                                ANAL-ONE
009600      05  FILLER PIC X(47) VALUE SPACES.                          ANAL-ONE
009650      05  FILLER PIC X(33) VALUE 'P(VOWEL/CONSONANT)'.            ANAL-ONE
009700      05  P-VOW-CONS  PIC 9.99999.                                ANAL-ONE
009750      05  FILLER PIC X(46) VALUE SPACES.                          ANAL-ONE
009800 01  OUTPT-FOUR-D.                                                ANAL-ONE
009850      05  FILLER PIC X(47) VALUE SPACES.                          ANAL-ONE
009900      05  FILLER PIC X(33) VALUE 'P(CONSONANT/CONSONANT)'.        ANAL-ONE
009950      05  P-CONS-CONS PIC 9.99999.                                ANAL-ONE
010000      05  FILLER PIC X(46) VALUE SPACES.                          ANAL-ONE
010050 01  OUTPT-FOUR-E.                                                ANAL-ONE
010100      05  FILLER PIC X(11) VALUE SPACES.                          ANAL-ONE
010150      05  FILLER PIC X(32) VALUE 'YULE-S CHARACTERISTIC, K, FOR:'. ANAL-ONE
010200      05  OUTPT-FOUR-LANG PIC X(30).                              ANAL-ONE
010250      05  YULES-K PIC Z(12)9.999.                                 ANAL-ONE
010300      05  FILLER PIC X(40) VALUE SPACES.                          ANAL-ONE
010350 01  OUTPT-FOUR-F.                                                ANAL-ONE
010400      05  FILLER PIC X.                                           ANAL-ONE
010450      05  FILLER PIC X(94) VALUE 'KOLMOGOROV-SMIRNOV CUMULATED RELAANAL-ONE
010500-     'TIVE FREQUENCY TABLE FOR INDEPENDENT LETTER OCCURRENCES IN: ANAL-ONE
010550-     ' '.                                                         ANAL-ONE
010600      05  OUTPT-FOUR-KS-LANG PIC X(30).                           ANAL-ONE
010650      05  FILLER PIC X(9)  VALUE SPACES.                          ANAL-ONE
010700 01  OUTPT-FOUR-G.                                                ANAL-ONE
010750      05  FILLER PIC X(37) VALUE SPACES.                          ANAL-ONE
010800      05  FILLER PIC X(25) VALUE 'LETTER'.                        ANAL-ONE
010850      05  FILLER PIC X(71) VALUE 'CUM. REL. FREQ.'.               ANAL-ONE
010900 01  KS-LINE.                                                     ANAL-ONE
010950      05  FILLER PIC X(40) VALUE SPACES.                          ANAL-ONE
011000      05  KS-LTR PIC X.                                           ANAL-ONE
011050      05  FILLER PIC X(25) VALUE SPACES.                          ANAL-ONE
011100      05  KS-CRF PIC 9.99999.                                     ANAL-ONE
011150      05  FILLER PIC X(60) VALUE SPACES.                          ANAL-ONE
011200 01  ERROR-LINE.                                                  ANAL-ONE
011250      05  FILLER PIC X.                                           ANAL-ONE
011300      05  FILLER PIC X(28) VALUE 'OVERFLOW ERROR AT STATEMENT '.  ANAL-ONE
011350      05  ER-STEP PIC 9(6).                                       ANAL-ONE
011400      05  FILLER PIC X(21) VALUE ' CARD IN PROCESS WAS '.         ANAL-ONE
011450      05  ER-CARD PIC 9(6).                                       ANAL-ONE
011500      05  FILLER PIC X(71) VALUE ALL '*'.                         ANAL-ONE
011550 01  DATA-FORM.                                                   ANAL-ONE
011600      05  CC PIC X, OCCURS 73 TIMES.                              ANAL-ONE
011650      05  FILLER PIC X(7).                                        ANAL-ONE
011700 01  OUTPT-FIVE-A.                                                ANAL-ONE
011750      05  FILLER PIC X(49) VALUE SPACES.                          ANAL-ONE
011800      05  FILLER PIC X(37) VALUE 'JOINT PROBABILITY TABLE FOR X(1)-ANAL-ONE
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011850-     'X(2)'.                                                      ANAL-ONE
011900          05  FILLER PIC X(47) VALUE SPACES.                      ANAL-ONE
011950 01       OUTPT-FIVE-B.                                            ANAL-ONE
012000          05  FILLER PIC X(11) VALUE SPACES.                      ANAL-ONE
012050          05  FILLER PIC X(25) VALUE 'YULE-S K FOR X(1)-X(2):'.   ANAL-ONE
012100          05  YULES-K-2 PIC Z(12)9.999.                           ANAL-ONE
012150          05  FILLER PIC X(80) VALUE SPACES.                      ANAL-ONE
012200 01       OUTPT-SIX-A.                                             ANAL-ONE
012250          05  FILLER PIC X(49) VALUE SPACES.                      ANAL-ONE
012300          05  FILLER PIC X(37) VALUE 'JOINT PROBABILITY TABLE FOR X(1)-ANAL-ONE
012350-     'X(3)'.                                                      ANAL-ONE
012400          05  FILLER PIC X(47) VALUE SPACES.                      ANAL-ONE
012450 01       OUTPT-SIX-B.                                             ANAL-ONE
012500          05  FILLER PIC X(11) VALUE SPACES.                      ANAL-ONE
012550          05  FILLER PIC X(25) VALUE 'YULE-S K FOR X(1)-X(3):'.   ANAL-ONE
012600          05  YULES-K-3 PIC Z(12)9.999.                           ANAL-ONE
012650          05  FILLER PIC X(80) VALUE SPACES.                      ANAL-ONE
012700 01       CARD-FILL.                                               ANAL-ONE
012750          05  TEST PIC X.                                         ANAL-ONE
012800          05  SEQ-NR PIC 999.                                     ANAL-ONE
012850          05  LANG-ID PIC X(10).                                  ANAL-ONE
012900          05  CRF-OUT PIC 9V9(5), OCCURS 11 TIMES.                ANAL-ONE
012950 PROCEDURE DIVISION.                                               ANAL-ONE
013000 START-UP.                                                         ANAL-ONE
013050          OPEN INPUT POPULATION, OUTPUT LANG-ANAL, CARD-FILE.      ANAL-ONE
013100 BEGIN.                                                            ANAL-ONE
013150          READ POPULATION AT END GO TO EOJ.                        ANAL-ONE
013200          IF NEW-LANG PERFORM CLOSE-OUT-RT THRU INITIALIZE-RT.     ANAL-ONE
013250          PERFORM DAT-SHIFT VARYING X FROM 1 BY 1 UNTIL X > 71.    ANAL-ONE
013300          ADD 1 TO CARD-NR ON SIZE ERROR GO TO E-1.                ANAL-ONE
013350          MOVE 3 TO N.                                             ANAL-ONE
013400 DATA-COLL.                                                        ANAL-ONE
013450          IF CC (N) = SPACE GO TO BLANK-COL-STEP.                  ANAL-ONE
013500          MOVE 1 TO A.                                             ANAL-ONE
013550 CK-ONE.                                                           ANAL-ONE
013600          IF CC (N) = LTR (A) GO TO PROC-TWO.                      ANAL-ONE
013650          IF A = 33 GO TO COL-STEP.                                ANAL-ONE
013700          ADD 1 TO A.                                              ANAL-ONE
013750          GO TO CK-ONE.                                            ANAL-ONE
013800 PROC-TWO.                                                         ANAL-ONE
013850          ADD 1 TO ILF (A) ON SIZE ERROR GO TO E-2.                ANAL-ONE
013900          COMPUTE M = N + 1.                                       ANAL-ONE
013950          IF CC (M) = SPACE GO TO COL-STEP.                        ANAL-ONE
014000          IF CC (M) = '-' AND M = 73 PERFORM CARD-STEP-ONE.        ANAL-ONE
014050          MOVE 1 TO B.                                             ANAL-ONE
014100 CK-TWO.                                                           ANAL-ONE
014150          IF CC (M) = LTR (B) GO TO PROC-THREE.                    ANAL-ONE
014200          IF B = 33 GO TO COL-STEP.                                ANAL-ONE
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014250      ADD 1 TO B.                                                    ANAL-ONE
014300      GO TO CK-TWO.                                                  ANAL-ONE
014350 PROC-THREE.                                                         ANAL-ONE
014400      ADD 1 TO FOL-FREQ (A, B) ON SIZE ERROR GO TO E-3.              ANAL-ONE
014450      IF A < 11 AND B < 11 ADD 1 TO F-VOW-VOW SIZE ERROR GO TO E-4.ANAL-ONE
014500      IF A < 11 AND B NOT < 11 ADD 1 TO F-CONS-VOW ON SIZE           ANAL-ONE
014550          ERROR GO TO E-5.                                           ANAL-ONE
014600      IF A NOT < 11 AND B < 11 ADD 1 TO F-VOW-CONS ON SIZE           ANAL-ONE
014650          ERROR GO TO E-6.                                           ANAL-ONE
014700      IF A NOT < 11 AND B NOT < 11 ADD 1 TO F-CONS-CONS ON SIZE      ANAL-ONE
014750          ERROR GO TO E-7.                                           ANAL-ONE
014800      COMPUTE L = N + 2.                                             ANAL-ONE
014850      IF CC (L) = SPACE GO TO COL-STEP.                              ANAL-ONE
014900      IF CC (L) = '-' AND L = 73 PERFORM CARD-STEP-TWO.              ANAL-ONE
014950      MOVE 1 TO B.                                                   ANAL-ONE
015000 CK-THREE.                                                           ANAL-ONE
015050      IF CC (L) = LTR (B) PERFORM ADER.                              ANAL-ONE
015100      IF CC (L) = LTR (B) GO TO COL-STEP.                            ANAL-ONE
015150      IF B = 33 GO TO COL-STEP.                                      ANAL-ONE
015200      ADD 1 TO B.                                                    ANAL-ONE
015250      GO TO CK-THREE.                                                ANAL-ONE
015300 COL-STEP.                                                           ANAL-ONE
015350      IF N NOT < 72 GO TO BEGIN.                                     ANAL-ONE
015400      ADD 1 TO N.                                                    ANAL-ONE
015450      GO TO DATA-COLL.                                               ANAL-ONE
015500 EOJ.                                                                ANAL-ONE
015550      PERFORM CLOSE-OUT-RT.                                          ANAL-ONE
015600      PERFORM LOOP-RT 5 TIMES.                                       ANAL-ONE
015650      MOVE SPACES TO PRINT-LINE.                                     ANAL-ONE
015700      WRITE PRINT-LINE AFTER TOP-OF-PAGE.                            ANAL-ONE
015750      CLOSE POPULATION, LANG-ANAL, CARD-FILE.                        ANAL-ONE
015800      STOP RUN.                                                      ANAL-ONE
015850 LOOP-RT.                                                            ANAL-ONE
015900      MOVE SPACES TO PRINT-LINE.                                     ANAL-ONE
015950      WRITE PRINT-LINE AFTER 1.                                      ANAL-ONE
016000 BLANK-COL-STEP.                                                     ANAL-ONE
016050      ADD 1 TO N.                                                    ANAL-ONE
016100      IF N = 73 GO TO BEGIN.                                         ANAL-ONE
016150      GO TO DATA-COLL.                                               ANAL-ONE
016200 CARD-STEP-ONE.                                                      ANAL-ONE
016250      MOVE 2 TO N.                                                   ANAL-ONE
016300      MOVE CC (72) TO CC (2).                                        ANAL-ONE
016350      READ POPULATION AT END GO TO EOJ.                              ANAL-ONE
016400      PERFORM DAT-SHIFT VARYING X FROM 1 BY 1 UNTIL X > 71.          ANAL-ONE
016450      ADD 1 TO CARD-NR ON SIZE ERROR GO TO E-9.                      ANAL-ONE
016500      COMPUTE M = N + 1.                                             ANAL-ONE
016550 CARD-STEP-TWO.                                                      ANAL-ONE
016600      MOVE 1 TO N.                                                   ANAL-ONE
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016650      MOVE CC (71) TO CC (1).                                          ANAL-ONE
016700      MOVE CC (72) TO CC (2).                                          ANAL-ONE
016750      READ POPULATION AT END GO TO EOJ.                                ANAL-ONE
016800      PERFORM DAT-SHIFT VARYING X FROM 1 BY 1 UNTIL X > 71.            ANAL-ONE
016850      ADD 1 TO CARD-NR ON SIZE ERROR GO TO E-10.                       ANAL-ONE
016900      COMPUTE L = N + 2.                                               ANAL-ONE
016950 CLOSE-OUT-RT.                                                         ANAL-ONE
017000      IF CARD-NR = 0 GO TO INITIALIZE-RT.                              ANAL-ONE
017050      MOVE ZEROS TO ILF-TOTAL.                                         ANAL-ONE
017100      PERFORM IND-TOTAL-CALC VARYING A FROM 1 BY 1 UNTIL A > 33.       ANAL-ONE
017150      PERFORM IND-PROB-CALC VARYING A FROM 1 BY 1 UNTIL A > 33.        ANAL-ONE
017200      PERFORM OUTPT-ONE-PREP.                                          ANAL-ONE
017250      PERFORM OUTPT-ONE-PRINT VARYING A FROM 1 BY 1 UNTIL A > 33.      ANAL-ONE
017300      MOVE ILF-TOTAL TO ONE-F-ILF-TLT.                                 ANAL-ONE
017350      WRITE PRINT-LINE FROM OUTPT-ONE-F BEFORE 1.                      ANAL-ONE
017400      PERFORM DEPN-TWO-CALC VARYING A FROM 1 BY 1 UNTIL A > 33.        ANAL-ONE
017450      PERFORM OUTPT-TWO-PREP.                                          ANAL-ONE
017500      PERFORM COL-TITLES-A VARYING A FROM 1 BY 1 UNTIL A > 13.         ANAL-ONE
017550      WRITE PRINT-LINE FROM FIRST-LTR-TITLES BEFORE 2.                 ANAL-ONE
017600      PERFORM OUTPT-TWO-DUMP-A VARYING B FROM 1 BY 1 UNTIL B > 23.     ANAL-ONE
017650      PERFORM OUTPT-TWO-PREP.                                          ANAL-ONE
017700      PERFORM COL-TITLES-B VARYING A FROM 14 BY 1 UNTIL A > 26.        ANAL-ONE
017750      WRITE PRINT-LINE FROM FIRST-LTR-TITLES BEFORE 2.                 ANAL-ONE
017800      PERFORM OUTPT-TWO-DUMP-B VARYING B FROM 1 BY 1 UNTIL B > 23.     ANAL-ONE
017850      PERFORM OUTPT-TWO-PREP.                                          ANAL-ONE
017900      PERFORM FLUSHING VARYING A FROM 1 BY 1 UNTIL A > 13.             ANAL-ONE
017950      PERFORM COL-TITLES-C VARYING A FROM 27 BY 1 UNTIL A > 33.        ANAL-ONE
018000      WRITE PRINT-LINE FROM FIRST-LTR-TITLES BEFORE 2.                 ANAL-ONE
018050      PERFORM OUTPT-TWO-DUMP-C VARYING B FROM 1 BY 1 UNTIL B > 23.     ANAL-ONE
018100      PERFORM OUTPT-TWO-PREP.                                          ANAL-ONE
018150      PERFORM COL-TITLES-A VARYING A FROM 1 BY 1 UNTIL A > 13.         ANAL-ONE
018200      WRITE PRINT-LINE FROM FIRST-LTR-TITLES BEFORE 2.                 ANAL-ONE
018250      PERFORM OUTPT-TWO-DUMP-A VARYING B FROM 24 BY 1 UNTIL B > 33.ANAL-ONE
018300      PERFORM OUTPT-TWO-PREP.                                          ANAL-ONE
018350      PERFORM COL-TITLES-B VARYING A FROM 14 BY 1 UNTIL A > 26.        ANAL-ONE
018400      WRITE PRINT-LINE FROM FIRST-LTR-TITLES BEFORE 2.                 ANAL-ONE
018450      PERFORM OUTPT-TWO-DUMP-B VARYING B FROM 24 BY 1 UNTIL B > 33.ANAL-ONE
018500      PERFORM OUTPT-TWO-PREP.                                          ANAL-ONE
018550      PERFORM FLUSHING VARYING A FROM 1 BY 1 UNTIL A > 13.             ANAL-ONE
018600      PERFORM COL-TITLES-C VARYING A FROM 27 BY 1 UNTIL A > 33.        ANAL-ONE
018650      WRITE PRINT-LINE FROM FIRST-LTR-TITLES BEFORE 2.                 ANAL-ONE
018700      PERFORM OUTPT-TWO-DUMP-C VARYING B FROM 24 BY 1 UNTIL B > 33.ANAL-ONE
018750      PERFORM DEPN-THREE-CALC VARYING A FROM 1 BY 1 UNTIL A > 33.      ANAL-ONE
018800      PERFORM OUTPT-THREE-PREP.                                        ANAL-ONE
018850      PERFORM COL-TITLES-A VARYING A FROM 1 BY 1 UNTIL A > 13.         ANAL-ONE
018900      WRITE PRINT-LINE FROM FIRST-LTR-TITLES BEFORE 2.                 ANAL-ONE
018950      PERFORM OUTPT-TWO-DUMP-A VARYING B FROM 34 BY 1 UNTIL B > 56.ANAL-ONE
019000      PERFORM OUTPT-THREE-PREP.                                        ANAL-ONE
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019050      PERFORM COL-TITLES-B VARYING A FROM 14 BY 1 UNTIL A > 26.     ANAL-ONE
019100      WRITE PRINT-LINE FROM FIRST-LTR-TITLES BEFORE 2.              ANAL-ONE
019150      PERFORM OUTPT-TWO-DUMP-B VARYING B FROM 34 BY 1 UNTIL B > 56.ANAL-ONE
019200      PERFORM OUTPT-THREE-PREP.                                     ANAL-ONE
019250      PERFORM FLUSHING VARYING A FROM 1 BY 1 UNTIL A > 13.          ANAL-ONE
019300      PERFORM COL-TITLES-C VARYING A FROM 27 BY 1 UNTIL A > 33.     ANAL-ONE
019350      WRITE PRINT-LINE FROM FIRST-LTR-TITLES BEFORE 2.              ANAL-ONE
019400      PERFORM OUTPT-TWO-DUMP-C VARYING B FROM 34 BY 1 UNTIL B > 56.ANAL-ONE
019450      PERFORM OUTPT-THREE-PREP.                                     ANAL-ONE
019500      PERFORM COL-TITLES-A VARYING A FROM 1 BY 1 UNTIL A > 13.      ANAL-ONE
019550      WRITE PRINT-LINE FROM FIRST-LTR-TITLES BEFORE 2.              ANAL-ONE
019600      PERFORM OUTPT-TWO-DUMP-A VARYING B FROM 57 BY 1 UNTIL B > 66.ANAL-ONE
019650      PERFORM OUTPT-THREE-PREP.                                     ANAL-ONE
019700      PERFORM COL-TITLES-B VARYING A FROM 14 BY 1 UNTIL A > 26.     ANAL-ONE
019750      WRITE PRINT-LINE FROM FIRST-LTR-TITLES BEFORE 2.              ANAL-ONE
019800      PERFORM OUTPT-TWO-DUMP-B VARYING B FROM 57 BY 1 UNTIL B > 66.ANAL-ONE
019850      PERFORM OUTPT-THREE-PREP.                                     ANAL-ONE
019900      PERFORM FLUSHING VARYING A FROM 1 BY 1 UNTIL A > 13.          ANAL-ONE
019950      PERFORM COL-TITLES-C VARYING A FROM 27 BY 1 UNTIL A > 33.     ANAL-ONE
020000      WRITE PRINT-LINE FROM FIRST-LTR-TITLES BEFORE 2.              ANAL-ONE
020050      PERFORM OUTPT-TWO-DUMP-C VARYING B FROM 57 BY 1 UNTIL B > 66.ANAL-ONE
020100      PERFORM VC-DUMP.                                              ANAL-ONE
020150      PERFORM YULE-PREP VARYING A FROM 1 BY 1 UNTIL A > 33.         ANAL-ONE
020200      COMPUTE YULES-K ROUNDED = (10000 * (S - ILF-TOTAL)) /         ANAL-ONE
020250          (ILF-TOTAL ** 2).                                         ANAL-ONE
020300      WRITE PRINT-LINE FROM OUTPT-FOUR-E BEFORE 4.                  ANAL-ONE
020350      WRITE PRINT-LINE FROM OUTPT-FOUR-F BEFORE 2.                  ANAL-ONE
020400      WRITE PRINT-LINE FROM OUTPT-FOUR-G BEFORE 2.                  ANAL-ONE
020450      PERFORM KS-CALC VARYING A FROM 1 BY 1 UNTIL A > 33.           ANAL-ONE
020500      PERFORM JOINT-PROB.                                           ANAL-ONE
020550 INITIALIZE-RT.                                                     ANAL-ONE
020600      MOVE LANG-KEY TO LANG-ID.                                     ANAL-ONE
020650      MOVE ZEROS TO VC-TOTAL, A, B, N, F-CONS-CONS, F-VOW-CONS,     ANAL-ONE
020700          F-CONS-VOW, F-VOW-VOW, FOL-FREQ-TOTAL, S, ILF-TOTAL,      ANAL-ONE
020750          CRF-TOTAL, CARD-NR, L, M.                                 ANAL-ONE
020800      PERFORM ZEROING-ONE VARYING A FROM 1 BY 1 UNTIL A > 33.       ANAL-ONE
020850      PERFORM ZEROING-TWO VARYING A FROM 1 BY 1 UNTIL A > 33        ANAL-ONE
020900          AFTER B FROM 1 BY 1 UNTIL B > 66.                         ANAL-ONE
020950      MOVE LANGUAGE TO LANG-DESIG, OUTPT-FOUR-LANG,                 ANAL-ONE
021000          OUTPT-FOUR-KS-LANG.                                       ANAL-ONE
021050      READ POPULATION AT END GO TO DUMP.                            ANAL-ONE
021100 IND-TOTAL-CALC.                                                    ANAL-ONE
021150      COMPUTE ILF-TOTAL = ILF-TOTAL + ILF (A).                      ANAL-ONE
021200 IND-PROB-CALC.                                                     ANAL-ONE
021250      IF ILF (A) > 0 COMPUTE ILP (A) ROUNDED =                      ANAL-ONE
021300          (ILF (A) / ILF-TOTAL), ELSE MOVE ZEROS TO ILP (A).        ANAL-ONE
021350 OUTPT-ONE-PREP.                                                    ANAL-ONE
021400      MOVE SPACES TO PRINT-LINE.                                    ANAL-ONE
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021450      WRITE PRINT-LINE FROM OUTPT-ONE-A AFTER TOP-OF-PAGE.          ANAL-ONE
021500      WRITE PRINT-LINE FROM OUTPT-ONE-B BEFORE 1.                   ANAL-ONE
021550      WRITE PRINT-LINE FROM LANG-LINE AFTER 1.                      ANAL-ONE
021600      WRITE PRINT-LINE FROM LANG-UNDERLINE BEFORE 1.                ANAL-ONE
021650      WRITE PRINT-LINE FROM OUTPT-ONE-C AFTER 2.                    ANAL-ONE
021700      WRITE PRINT-LINE FROM OUTPT-ONE-D BEFORE 2.                   ANAL-ONE
021750 OUTPT-ONE-PRINT.                                                   ANAL-ONE
021800      MOVE LTR (A) TO LTR-ONE.                                      ANAL-ONE
021850      MOVE ILF (A) TO FREQ-ONE.                                     ANAL-ONE
021900      MOVE ILP (A) TO PROB-ONE.                                     ANAL-ONE
021950      WRITE PRINT-LINE FROM OUTPT-ONE-E BEFORE 2.                   ANAL-ONE
022000 DEPN-TWO-CALC.                                                     ANAL-ONE
022050      MOVE ZEROS TO FOL-FREQ-TOTAL.                                 ANAL-ONE
022100      PERFORM DEPN-TWO-SUM VARYING B FROM 1 BY 1 UNTIL B > 33.      ANAL-ONE
022150      PERFORM DEPN-TWO-PROB VARYING B FROM 1 BY 1 UNTIL B > 33.     ANAL-ONE
022200 DEPN-TWO-SUM.                                                      ANAL-ONE
022250      COMPUTE FOL-FREQ-TOTAL = FOL-FREQ-TOTAL + FOL-FREQ (A, B).    ANAL-ONE
022300 DEPN-TWO-PROB.                                                     ANAL-ONE
022350      IF FOL-FREQ (A, B) > 0 COMPUTE FOL-PROB (A, B) ROUNDED =      ANAL-ONE
022400      (FOL-FREQ (A, B) / FOL-FREQ-TOTAL), ELSE MOVE ZEROS           ANAL-ONE
022450      TO FOL-PROB (A, B).                                           ANAL-ONE
022500 OUTPT-TWO-PREP.                                                    ANAL-ONE
022550      MOVE SPACES TO PRINT-LINE.                                    ANAL-ONE
022600      WRITE PRINT-LINE FROM OUTPT-TWO-A AFTER TOP-OF-PAGE.          ANAL-ONE
022650      WRITE PRINT-LINE FROM OUTPT-TWO-THREE-B BEFORE 1.             ANAL-ONE
022700      WRITE PRINT-LINE FROM LANG-LINE BEFORE 0.                     ANAL-ONE
022750      WRITE PRINT-LINE FROM LANG-UNDERLINE BEFORE 2.                ANAL-ONE
022800      WRITE PRINT-LINE FROM FIRST-LTR-OUTPT BEFORE 2.               ANAL-ONE
022850 COL-TITLES-A.                                                      ANAL-ONE
022900      MOVE LTR (A) TO FIRST-LTR (A).                                ANAL-ONE
022950 OUTPT-TWO-DUMP-A.                                                  ANAL-ONE
023000      PERFORM DUMP-A VARYING A FROM 1 BY 1 UNTIL A > 13.            ANAL-ONE
023050      WRITE PRINT-LINE FROM DEPN-FREQ-LINE BEFORE 1.                ANAL-ONE
023100      PERFORM DUMP-B VARYING A FROM 1 BY 1 UNTIL A > 13.            ANAL-ONE
023150      WRITE PRINT-LINE FROM DEPN-PROB-LINE BEFORE 2.                ANAL-ONE
023200 OUTPT-TWO-DUMP-B.                                                  ANAL-ONE
023250      PERFORM DUMP-A VARYING A FROM 14 BY 1 UNTIL A > 26.           ANAL-ONE
023300      WRITE PRINT-LINE FROM DEPN-FREQ-LINE BEFORE 1.                ANAL-ONE
023350      PERFORM DUMP-B VARYING A FROM 14 BY 1 UNTIL A > 26.           ANAL-ONE
023400      WRITE PRINT-LINE FROM DEPN-PROB-LINE BEFORE 2.                ANAL-ONE
023450 OUTPT-TWO-DUMP-C.                                                  ANAL-ONE
023500      PERFORM DUMP-A VARYING A FROM 27 BY 1 UNTIL A > 33.           ANAL-ONE
023550      WRITE PRINT-LINE FROM DEPN-FREQ-LINE BEFORE 1.                ANAL-ONE
023600      PERFORM DUMP-B VARYING A FROM 27 BY 1 UNTIL A > 33.           ANAL-ONE
023650      WRITE PRINT-LINE FROM DEPN-PROB-LINE BEFORE 2.                ANAL-ONE
023700 COL-TITLES-B.                                                      ANAL-ONE
023750      COMPUTE L = A - 13.                                           ANAL-ONE
023800      MOVE LTR (A) TO FIRST-LTR (L).                                ANAL-ONE
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023850 CCL-TITLES-C.                                                    ANAL-ONE
023900     COMPUTE L = A - 26.                                          ANAL-ONE
023950     MOVE LTR (A) TO FIRST-LTR (L).                               ANAL-ONE
024000 DEPN-THREE-CALC.                                                 ANAL-ONE
024050     MOVE ZEROS TO FOL-FREQ-TOTAL.                                ANAL-ONE
024100     PERFORM DEPN-TWO-SUM VARYING B FROM 34 BY 1 UNTIL B > 66.    ANAL-ONE
024150     PERFORM DEPN-TWO-PROB VARYING B FROM 34 BY 1 UNTIL B > 66.   ANAL-ONE
024200 OUTPT-THREE-PREP.                                                ANAL-ONE
024250     MOVE SPACES TO PRINT-LINE.                                   ANAL-ONE
024300     WRITE PRINT-LINE FROM OUTPT-THREE-A AFTER TOP-OF-PAGE.       ANAL-ONE
024350     WRITE PRINT-LINE FROM OUTPT-TWO-THREE-B BEFORE 1.            ANAL-ONE
024400     WRITE PRINT-LINE FROM LANG-LINE BEFORE 0.                    ANAL-ONE
024450     WRITE PRINT-LINE FROM LANG-UNDERLINE BEFORE 2.               ANAL-ONE
024500     WRITE PRINT-LINE FROM FIRST-LTR-OUTPT BEFORE 2.              ANAL-ONE
024550 VC-DUMP.                                                         ANAL-ONE
024600     COMPUTE VC-TOTAL = F-CONS-CONS + F-VOW-CONS + F-CONS-VOW     ANAL-ONE
024650         + F-VOW-VOW.                                             ANAL-ONE
024700     IF F-VOW-VOW > 0 COMPUTE P-VOW-VOW ROUNDED = F-VOW-VOW /     ANAL-ONE
024750         VC-TOTAL ELSE MOVE ZEROS TO P-VOW-VOW.                   ANAL-ONE
024800     IF F-CONS-VOW > 0 COMPUTE P-CONS-VOW ROUNDED = F-CONS-VOW /  ANAL-ONE
024850         VC-TOTAL ELSE MOVE ZEROS TO P-CONS-VOW.                  ANAL-ONE
024900     IF F-VOW-CONS > 0 COMPUTE P-VOW-CONS ROUNDED = F-VOW-CONS /  ANAL-ONE
024950         VC-TOTAL ELSE MOVE ZEROS TO P-VOW-CONS.                  ANAL-ONE
025000     IF F-CONS-CONS > 0 COMPUTE P-CONS-CONS ROUNDED =             ANAL-ONE
025050         F-CONS-CONS / VC-TOTAL ELSE MOVE ZEROS TO P-CONS-CONS.   ANAL-ONE
025100     WRITE PRINT-LINE FROM LANG-LINE AFTER TOP-OF-PAGE.           ANAL-ONE
025150     WRITE PRINT-LINE FROM LANG-UNDERLINE BEFORE 3.               ANAL-ONE
025200     WRITE PRINT-LINE FROM OUTPT-FOUR-A BEFORE 2.                 ANAL-ONE
025250     WRITE PRINT-LINE FROM OUTPT-FOUR-B BEFORE 2.                 ANAL-ONE
025300     WRITE PRINT-LINE FROM OUTPT-FOUR-C BEFORE 2.                 ANAL-ONE
025350     WRITE PRINT-LINE FROM OUTPT-FOUR-D BEFORE 3.                 ANAL-ONE
025400 YULE-PREP.                                                       ANAL-ONE
025450     COMPUTE S = S + (ILF (A) ** 2).                              ANAL-ONE
025500 KS-CALC.                                                         ANAL-ONE
025550     COMPUTE CRF-TOTAL = CRF-TOTAL + ILP (A).                     ANAL-ONE
025600     MOVE LTR (A) TO KS-LTR.                                      ANAL-ONE
025650     MOVE CRF-TOTAL TO KS-CRF.                                    ANAL-ONE
025700     WRITE PRINT-LINE FROM KS-LINE BEFORE 1.                      ANAL-ONE
025750 E-1.                                                             ANAL-ONE
025800     MOVE 014300 TO ER-STEP.                                      ANAL-ONE
025850     GO TO DUMP.                                                  ANAL-ONE
025900 E-2.                                                             ANAL-ONE
025950         MOVE 014901 TO ER-STEP.                                  ANAL-ONE
026000     GO TO DUMP.                                                  ANAL-ONE
026050 E-3.                                                             ANAL-ONE
026100     MOVE 015400 TO ER-STEP.                                      ANAL-ONE
026150     GO TO DUMP.                                                  ANAL-ONE
026200 E-4.                                                             ANAL-ONE
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026250      MOVE 015450 TO ER-STEP.                                         ANAL-ONE
026300      GO TO DUMP.                                                     ANAL-ONE
026350 E-5.                                                                 ANAL-ONE
026400      MOVE 015550 TO ER-STEP.                                         ANAL-ONE
026450      GO TO DUMP.                                                     ANAL-ONE
026500 E-6.                                                                 ANAL-ONE
026550      MOVE 015650 TO ER-STEP.                                         ANAL-ONE
026600      GO TO DUMP.                                                     ANAL-ONE
026650 E-7.                                                                 ANAL-ONE
026700      MOVE 015750 TO ER-STEP.                                         ANAL-ONE
026750      GO TO DUMP.                                                     ANAL-ONE
026800 E-8.                                                                 ANAL-ONE
026850      MOVE 016000 TO ER-STEP.                                         ANAL-ONE
026900      GO TO DUMP.                                                     ANAL-ONE
026950 E-9.                                                                 ANAL-ONE
027000      MOVE 017300 TO ER-STEP.                                         ANAL-ONE
027050      GO TO DUMP.                                                     ANAL-ONE
027100 E-10.                                                                ANAL-ONE
027150      MOVE 017500 TO ER-STEP.                                         ANAL-ONE
027200 DUMP.                                                                ANAL-ONE
027250      MOVE CARD-NR TO ER-CARD.                                        ANAL-ONE
027300      WRITE PRINT-LINE FROM ERROR-LINE AFTER 2.                       ANAL-ONE
027350      GO TO EOJ.                                                      ANAL-ONE
027400 DUMP-A.                                                              ANAL-ONE
027450      IF B > 33 COMPUTE L = B - 33, MOVE LTR (L) TO FREQ-ROW-LTR,     ANAL-ONE
027500          ELSE MOVE LTR (B) TO FREQ-ROW-LTR.                          ANAL-ONE
027550      IF A < 14 MOVE FOL-FREQ (A, B) TO DEPN-FREQ (A).                ANAL-ONE
027600      IF A > 13 AND A < 27 COMPUTE M = A - 13, MOVE FOL-FREQ (A, B)ANAL-ONE
027650          TO DEPN-FREQ (M).                                           ANAL-ONE
027700      IF A > 26 COMPUTE M = A - 26, MOVE FOL-FREQ (A, B)              ANAL-ONE
027750          TO DEPN-FREQ (M).                                           ANAL-ONE
027800 DUMP-B.                                                              ANAL-ONE
027850      IF B > 33 COMPUTE L = B - 33, MOVE LTR (L) TO PROB-ROW-LTR,     ANAL-ONE
027900          ELSE MOVE LTR (B) TO PROB-ROW-LTR.                          ANAL-ONE
027950      IF A < 14 MOVE FOL-PROB (A, B) TO DEPN-PROB (A).                ANAL-ONE
028000      IF A > 13 AND A < 27 COMPUTE M = A - 13, MOVE FOL-PROB (A, B)ANAL-ONE
028050          TO DEPN-PROB (M).                                           ANAL-ONE
028100      IF A > 26 COMPUTE M = A - 26, MOVE FOL-PROB (A, B)              ANAL-ONE
028150          TO DEPN-PROB (M).                                           ANAL-ONE
028200 ZEROING-ONE.                                                         ANAL-ONE
028250      MOVE ZEROS TO ILF (A).                                          ANAL-ONE
028300      MOVE ZEROS TO ILP (A).                                          ANAL-ONE
028350 FLUSHING.                                                            ANAL-ONE
028400      MOVE SPACES TO FIRST-LTR (A).                                   ANAL-ONE
028450      MOVE ZEROS TO DEPN-FREQ (A).                                    ANAL-ONE
028500      MOVE ZEROS TO DEPN-PROB (A).                                    ANAL-ONE
028550 ZEROING-TWO.                                                         ANAL-ONE
028600      MOVE ZEROS TO FOL-FREQ (A, B).                                  ANAL-ONE
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028650     MOVE ZEROS TO FOL-PROB (A, B).                                ANAL-ONE
028700 ADER.                                                             ANAL-ONE
028750     COMPUTE B = B + 33.                                           ANAL-ONE
028800     ADD 1 TO FOL-FREQ (A, B) ON SIZE ERROR GO TO E-8.             ANAL-ONE
028850     COMPUTE B = B - 33.                                           ANAL-ONE
028900 DAT-SHIFT.                                                        ANAL-ONE
028950     COMPUTE Y = X + 2.                                            ANAL-ONE
029000     MOVE CB (X) TO CC (Y).                                        ANAL-ONE
029050 JOINT-PROB.                                                       ANAL-ONE
029100     MOVE ZEROS TO FOL-FREQ-TOTAL.                                 ANAL-ONE
029150     PERFORM DEPN-TWO-SUM VARYING A FROM 1 BY 1 UNTIL A > 33       ANAL-ONE
029200         AFTER B FROM 1 BY 1 UNTIL B > 33.                         ANAL-ONE
029250     PERFORM DEPN-TWO-PROB VARYING A FROM 1 BY 1 UNTIL A > 33      ANAL-ONE
029300         AFTER B FROM 1 BY 1 UNTIL B > 33.                         ANAL-ONE
029350     PERFORM OUTPT-FIVE-PREP.                                      ANAL-ONE
029400     PERFORM COL-TITLES-A VARYING A FROM 1 BY 1 UNTIL A > 13.      ANAL-ONE
029450     WRITE PRINT-LINE FROM FIRST-LTR-TITLES BEFORE 2.              ANAL-ONE
029500     PERFORM OUTPT-DUMP-D VARYING B FROM 1 BY 1 UNTIL B > 33.      ANAL-ONE
029550     PERFORM OUTPT-FIVE-PREP.                                      ANAL-ONE
029600     PERFORM COL-TITLES-B VARYING A FROM 14 BY 1 UNTIL A > 26.     ANAL-ONE
029650     WRITE PRINT-LINE FROM FIRST-LTR-TITLES BEFORE 2.              ANAL-ONE
029700     PERFORM OUTPT-DUMP-E VARYING B FROM 1 BY 1 UNTIL B > 33.      ANAL-ONE
029750     PERFORM OUTPT-FIVE-PREP.                                      ANAL-ONE
029800     PERFORM FLUSHING VARYING A FROM 1 BY 1 UNTIL A > 13.          ANAL-ONE
029850     PERFORM COL-TITLES-C VARYING A FROM 27 BY 1 UNTIL A > 33.     ANAL-ONE
029900     WRITE PRINT-LINE FROM FIRST-LTR-TITLES BEFORE 2.              ANAL-ONE
029950     PERFORM OUTPT-DUMP-F VARYING B FROM 1 BY 1 UNTIL B > 33.      ANAL-ONE
030000     MOVE ZEROS TO S.                                              ANAL-ONE
030050     PERFORM YULES-K-PREP VARYING A FROM 1 BY 1 UNTIL A > 33       ANAL-ONE
030100         AFTER B FROM 1 BY 1 UNTIL B > 33.                         ANAL-ONE
030150     COMPUTE YULES-K-2 ROUNDED = (10000 * (S - FOL-FREQ-TOTAL)) /  ANAL-ONE
030200         (FOL-FREQ-TOTAL ** 2).                                    ANAL-ONE
030250     WRITE PRINT-LINE FROM OUTPT-FIVE-B BEFORE 1.                  ANAL-ONE
030300     MOVE ZEROS TO CRF-TOTAL, WS-SEQ-NR, L.                        ANAL-ONE
030350     MOVE 'B' TO TEST.                                             ANAL-ONE
030400     PERFORM CARD-DUMP VARYING A FROM 1 BY 1 UNTIL A > 33          ANAL-ONE
030450         AFTER B FROM 1 BY 1 UNTIL B > 33.                         ANAL-ONE
030500     MOVE ZEROS TO FOL-FREQ-TOTAL.                                 ANAL-ONE
030550     PERFORM DEPN-TWO-SUM VARYING A FROM 1 BY 1 UNTIL A > 33       ANAL-ONE
030600         AFTER B FROM 34 BY 1 UNTIL B > 66.                        ANAL-ONE
030650     PERFORM DEPN-TWO-PROB VARYING A FROM 1 BY 1 UNTIL A > 33      ANAL-ONE
030700         AFTER B FROM 34 BY 1 UNTIL B > 66.                        ANAL-ONE
030750     PERFORM OUTPT-SIX-PREP.                                       ANAL-ONE
030800     PERFORM COL-TITLES-A VARYING A FROM 1 BY 1 UNTIL A > 13.      ANAL-ONE
030850     WRITE PRINT-LINE FROM FIRST-LTR-TITLES BEFORE 2.              ANAL-ONE
030900     PERFORM OUTPT-DUMP-D VARYING B FROM 34 BY 1 UNTIL B > 66.     ANAL-ONE
030950     PERFORM OUTPT-SIX-PREP.                                       ANAL-ONE
031000     PERFORM COL-TITLES-B VARYING A FROM 14 BY 1 UNTIL A > 26.     ANAL-ONE
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031050      WRITE PRINT-LINE FROM FIRST-LTR-TITLES BEFORE 2.                ANAL-ONE
031100      PERFORM OUTPT-DUMP-E VARYING B FROM 34 BY 1 UNTIL B > 66.       ANAL-ONE
031150      PERFORM OUTPT-SIX-PREP.                                         ANAL-ONE
031200      PERFORM FLUSHING VARYING A FROM 1 BY 1 UNTIL A > 13.            ANAL-ONE
031250      PERFORM COL-TITLES-C VARYING A FROM 27 BY 1 UNTIL A > 33.       ANAL-ONE
031300      WRITE PRINT-LINE FROM FIRST-LTR-TITLES BEFORE 2.                ANAL-ONE
031350      PERFORM OUTPT-DUMP-F VARYING B FROM 34 BY 1 UNTIL B > 66.       ANAL-ONE
031400      MOVE ZEROS TO S.                                                ANAL-ONE
031450      PERFORM YULES-K-PREP VARYING A FROM 1 BY 1 UNTIL A > 33         ANAL-ONE
031500          AFTER B FROM 34 BY 1 UNTIL B > 66.                          ANAL-ONE
031550      COMPUTE YULES-K-3 ROUNDED = (10000 * (S - FOL-FREQ-TOTAL)) /    ANAL-ONE
031600          (FOL-FREQ-TOTAL ** 2).                                      ANAL-ONE
031650      WRITE PRINT-LINE FROM OUTPT-SIX-B BEFORE 1.                     ANAL-ONE
031700      MOVE ZEROS TO CRF-TOTAL, WS-SEQ-NR, L.                          ANAL-ONE
031750      MOVE 'C' TO TEST.                                               ANAL-ONE
031800      PERFORM CARD-DUMP VARYING A FROM 1 BY 1 UNTIL A > 33            ANAL-ONE
031850          AFTER B FROM 34 BY 1 UNTIL B > 66.                          ANAL-ONE
031900 OUTPT-FIVE-PREP.                                                     ANAL-ONE
031950      WRITE PRINT-LINE FROM OUTPT-FIVE-A AFTER TOP-OF-PAGE.           ANAL-ONE
032000      WRITE PRINT-LINE FROM OUTPT-TWO-THREE-B BEFORE 1.               ANAL-ONE
032050      WRITE PRINT-LINE FROM LANG-LINE BEFORE 0.                       ANAL-ONE
032100      WRITE PRINT-LINE FROM LANG-UNDERLINE BEFORE 2.                  ANAL-ONE
032150      WRITE PRINT-LINE FROM FIRST-LTR-OUTPT BEFORE 2.                 ANAL-ONE
032200 OUTPT-DUMP-D.                                                        ANAL-ONE
032250      PERFORM DUMP-B VARYING A FROM 1 BY 1 UNTIL A > 13.              ANAL-ONE
032300      WRITE PRINT-LINE FROM DEPN-PROB-LINE BEFORE 2.                  ANAL-ONE
032350 OUTPT-DUMP-E.                                                        ANAL-ONE
032400      PERFORM DUMP-B VARYING A FROM 14 BY 1 UNTIL A > 26.             ANAL-ONE
032450      WRITE PRINT-LINE FROM DEPN-PROB-LINE BEFORE 2.                  ANAL-ONE
032500 OUTPT-DUMP-F.                                                        ANAL-ONE
032550      PERFORM DUMP-B VARYING A FROM 27 BY 1 UNTIL A > 33.             ANAL-ONE
032600      WRITE PRINT-LINE FROM DEPN-PROB-LINE BEFORE 2.                  ANAL-ONE
032650 OUTPT-SIX-PREP.                                                      ANAL-ONE
032700      WRITE PRINT-LINE FROM OUTPT-SIX-A AFTER TOP-OF-PAGE.            ANAL-ONE
032750      WRITE PRINT-LINE FROM OUTPT-TWO-THREE-B BEFORE 1.               ANAL-ONE
032800      WRITE PRINT-LINE FROM LANG-LINE BEFORE 0.                       ANAL-ONE
032850      WRITE PRINT-LINE FROM LANG-UNDERLINE BEFORE 2.                  ANAL-ONE
032900      WRITE PRINT-LINE FROM FIRST-LTR-OUTPT BEFORE 2.                 ANAL-ONE
032950 YULES-K-PREP.                                                        ANAL-ONE
033000      COMPUTE S = S + (FOL-FREQ (A, B) ** 2).                         ANAL-ONE
033050 CARD-DUMP.                                                           ANAL-ONE
033100      COMPUTE CRF-TOTAL = CRF-TOTAL + FOL-PROB (A, B).                ANAL-ONE
033150      ADD 1 TO L.                                                     ANAL-ONE
033200      MOVE CRF-TOTAL TO CRF-OUT (L).                                  ANAL-ONE
033250      IF L = 11 ADD 1 TO WS-SEQ-NR                                    ANAL-ONE
033300                MOVE WS-SEQ-NR TO SEQ-NR                              ANAL-ONE
033350                MOVE ZEROS TO L                                       ANAL-ONE
033400                WRITE CARD-OUT FROM CARD-FILL.                        ANAL-ONE
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APPENDIX H. POPULATION ANALYSIS PROGRAM (V-2)

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000050 IDENTIFICATION DIVISION.                                          ANAL-TWO
000100 PROGRAM-ID.  V2-LANGUAGE-ANALYSIS.                                ANAL-TWO
000150 AUTHOR.  LCDR. MORTON D. RAU, USN.                                ANAL-TWO
000200 REMARKS.  THIS PROGRAM IS PART OF MY MASTER OF SCIENCE IN         ANAL-TWO
000250     MANAGEMENT THESIS AND IS DESIGNED TO CALCULATE VARIOUS        ANAL-TWO
000300     STATISTICAL CHARACTERISTICS FOR LETTERS APPEARING IN          ANAL-TWO
000350     LANGUAGES WRITTEN IN THE MODERN LATIN ALPHABET.               ANAL-TWO
000400     VERSION TWO IS AN EXPANSION DESIGNED TO INCLUDE THE SPACE     ANAL-TWO
000450     RATE IN THESE LANGUAGES AND TO INCLUDE THE INTERDEPENDENCY    ANAL-TWO
000500     OF LETTERS IN ADJOINING WORDS.                                ANAL-TWO
000550 ENVIRONMENT DIVISION.                                              ANAL-TWO
000600 CONFIGURATION SECTION.                                             ANAL-TWO
000650 SOURCE-COMPUTER.  IBM-360-67.                                      ANAL-TWO
000700 OBJECT-COMPUTER.  IBM-360-67.                                      ANAL-TWO
000750 SPECIAL-NAMES.                                                     ANAL-TWO
000800     C01 IS TOP-OF-PAGE.                                           ANAL-TWO
000850 INPUT-OUTPUT SECTION.                                              ANAL-TWO
000900 FILE-CONTROL.                                                      ANAL-TWO
000950     SELECT POPULATION ASSIGN TO UR-S-IN1.                         ANAL-TWO
001000     SELECT LANG-ANAL ASSIGN TO UR-S-OUT1.                         ANAL-TWO
001050     SELECT CARD-FILE ASSIGN TO UR-S-OUT2.                         ANAL-TWO
001100 DATA DIVISION.                                                    ANAL-TWO
001150 FILE SECTION.                                                     ANAL-TWO
001200 FD  POPULATION                                                    ANAL-TWO
001250     LABEL RECORDS ARE OMITTED                                     ANAL-TWO
001300     BLOCK CONTAINS 5 RECORDS                                      ANAL-TWO
001350     DATA RECORD IS POP-CARD, LANG-CARD.                           ANAL-TWO
001400 01  POP-CARD.                                                     ANAL-TWO
001450     05  FILLER                    PIC XX.                        ANAL-TWO
001500     05  SAMPLE-FLD.                                              ANAL-TWO
001550         10  CC                    PIC X, OCCURS 71 TIMES.        ANAL-TWO
001600     05  FILLER                    PIC X(7).                      ANAL-TWO
001650 01  LANG-CARD.                                                    ANAL-TWO
001700     05  CARD-TYPE                 PIC A.                         ANAL-TWO
001750         88  NEW-LANG VALUE 'L'.                                  ANAL-TWO
001800     05  FILLER                    PIC X.                         ANAL-TWO
001850     05  LANGUAGE                  PIC X(30).                     ANAL-TWO
001900     05  FILLER                    PIC X(38).                     ANAL-TWO
001950     05  LANG-KEY                  PIC X(10).                     ANAL-TWO
002000 FD  LANG-ANAL                                                     ANAL-TWO
002050     LABEL RECORDS ARE OMITTED                                     ANAL-TWO
002100     BLOCK CONTAINS 5 RECORDS                                      ANAL-TWO
002150     DATA RECORD IS PRINT-LINE.                                    ANAL-TWO
002200 01  PRINT-LINE                    PIC X(133).                    ANAL-TWO
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002250 FD   CARD-FILE                                                   ANAL-TWO
002300      LABEL RECORDS ARE OMITTED                                   ANAL-TWO
002350      RECORD CONTAINS 80 CHARACTERS                               ANAL-TWO
002400      DATA RECORD IS CARD-OUT.                                    ANAL-TWO
002450 01   CARD-OUT                     PIC X(80).                    ANAL-TWO
002500 WORKING-STORAGE SECTION.                                         ANAL-TWO
002550 77   VC-TOTAL                     PIC 9(8) VALUE ZEROS.         ANAL-TWO
002600 77   A                             PIC 99, COMP, SYNC.           ANAL-TWO
002650 77   B                             PIC 99, COMP, SYNC.           ANAL-TWO
002700 77   L                             PIC 99, COMP, SYNC.           ANAL-TWO
002750 77   M                             PIC 99, COMP, SYNC.           ANAL-TWO
002800 77   N                             PIC 99, COMP, SYNC.           ANAL-TWO
002850 77   X                             PIC 99, COMP, SYNC.           ANAL-TWO
002900 77   Y                             PIC 99, COMP, SYNC.           ANAL-TWO
002950 77   F-CONS-CONS                  PIC 9(7), COMP, SYNC.         ANAL-TWO
003000 77   F-VOW-CONS                   PIC 9(7), COMP, SYNC.         ANAL-TWO
003050 77   F-CONS-VOW                   PIC 9(7), COMP, SYNC.         ANAL-TWO
003100 77   F-VOW-VOW                    PIC 9(7), COMP, SYNC.         ANAL-TWO
003150 77   FOL-FREQ-TOTAL               PIC 9(8), COMP, SYNC.         ANAL-TWO
003200 77   S                             PIC 9(12), COMP, SYNC.        ANAL-TWO
003250 77   ILF-TOTAL                    PIC 9(8), COMP, SYNC.         ANAL-TWO
003300 77   CRF-TOTAL                    PIC 9V9(5), COMP-3.           ANAL-TWO
003350 77   CARD-NR                      PIC 9(6), COMP-3, VALUE ZEROS. ANAL-TWO
003400 77   WS-SEQ-NR                    PIC 999.                      ANAL-TWO
003450 77   MATCH                        PIC 9.                        ANAL-TWO
003500 01   LTR-TABLE-VALUES.                                          ANAL-TWO
003550      05   FILLER                  PIC X    VALUE 'A'.           ANAL-TWO
003600      05   FILLER                  PIC X    VALUE 'E'.           ANAL-TWO
003650      05   FILLER                  PIC X    VALUE 'I'.           ANAL-TWO
003700      05   FILLER                  PIC X    VALUE 'O'.           ANAL-TWO
003750      05   FILLER                  PIC X    VALUE 'U'.           ANAL-TWO
003800      05   FILLER                  PIC X    VALUE '1'.           ANAL-TWO
003850      05   FILLER                  PIC X    VALUE '2'.           ANAL-TWO
003900      05   FILLER                  PIC X    VALUE '3'.           ANAL-TWO
003950      05   FILLER                  PIC X    VALUE '4'.           ANAL-TWO
004000      05   FILLER                  PIC X    VALUE '5'.           ANAL-TWO
004050      05   FILLER                  PIC X    VALUE 'B'.           ANAL-TWO
004100      05   FILLER                  PIC X    VALUE 'C'.           ANAL-TWO
004150      05   FILLER                  PIC X    VALUE 'D'.           ANAL-TWO
004200      05   FILLER                  PIC X    VALUE 'F'.           ANAL-TWO
004250      05   FILLER                  PIC X    VALUE 'G'.           ANAL-TWO
004300      05   FILLER                  PIC X    VALUE 'H'.           ANAL-TWO
004350      05   FILLER                  PIC X    VALUE 'J'.           ANAL-TWO
004400      05   FILLER                  PIC X    VALUE 'K'.           ANAL-TWO
004450      05   FILLER                  PIC X    VALUE 'L'.           ANAL-TWO
004500      05   FILLER                  PIC X    VALUE 'M'.           ANAL-TWO
004550      05   FILLER                  PIC X    VALUE 'N'.           ANAL-TWO
004600      05   FILLER                  PIC X    VALUE 'P'.           ANAL-TWO
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004650      05  FILLER                          PIC X    VALUE 'Q'.                ANAL-TWO
004700      05  FILLER                          PIC X    VALUE 'R'.                ANAL-TWO
004750      05  FILLER                          PIC X    VALUE 'S'.                ANAL-TWO
004800      05  FILLER                          PIC X    VALUE 'T'.                ANAL-TWO
004850      05  FILLER                          PIC X    VALUE 'V'.                ANAL-TWO
004900      05  FILLER                          PIC X    VALUE 'W'.                ANAL-TWO
004950      05  FILLER                          PIC X    VALUE 'X'.                ANAL-TWO
005000      05  FILLER                          PIC X    VALUE 'Y'.                ANAL-TWO
005050      05  FILLER                          PIC X    VALUE 'Z'.                ANAL-TWO
005100      05  FILLER                          PIC X    VALUE '6'.                ANAL-TWO
005150      05  FILLER                          PIC X    VALUE '7'.                ANAL-TWO
005200      05  FILLER                          PIC X    VALUE '-'.                ANAL-TWO
005250 01   LTR-TABLE REDEFINES LTR-TABLE-VALUES.                                   ANAL-TWO
005300      05  LTR                             PIC X, OCCURS 34 TIMES.             ANAL-TWO
005350 01   IND-FREQ-TABLE.                                                          ANAL-TWO
005400      05  ILF  PIC 9(6), COMP, SYNC, OCCURS 34 TIMES.                         ANAL-TWO
005450 01   IND-PROB-TABLE.                                                          ANAL-TWO
005500      05  ILP  PIC 9V9(5), COMP, SYNC, OCCURS 34 TIMES.                       ANAL-TWO
005550 01   DEPENDENCY-FREQ-TABLE.                                                  ANAL-TWO
005600      05  FST-LTR  OCCURS 34 TIMES.                                           ANAL-TWO
005650          10  FOL-FREQ  PIC 9(6), COMP, SYNC, OCCURS 68 TIMES.                ANAL-TWO
005700 01   DEPENDENCY-PROB-TABLE.                                                  ANAL-TWO
005750      05  GIVEN-LTR  OCCURS 34 TIMES.                                         ANAL-TWO
005800          10  FOL-PROB  PIC 9V9(5), COMP, SYNC, OCCURS 68 TIMES.              ANAL-TWO
005850 01   OUTPT-ONE-A.                                                            ANAL-TWO
005900      05  FILLER                          PIC X(43) VALUE SPACES.             ANAL-TWO
005950      05  FILLER                          PIC X(48) VALUE 'FREQUENCY/INDEPEANAL-TWO
006000-     'NDENT PROBABILITY OF EACH LETTER'.                                     ANAL-TWO
006050      05  FILLER                          PIC X(42) VALUE SPACES.             ANAL-TWO
006100 01   LANG-LINE.                                                              ANAL-TWO
006150      05  FILLER                          PIC X(54) VALUE SPACES.             ANAL-TWO
006200      05  FILLER                          PIC X(11) VALUE 'LANGUAGE:'.        ANAL-TWO
006250      05  LANG-DESIG                      PIC X(30).                          ANAL-TWO
006300      05  FILLER                          PIC X(38) VALUE SPACES.             ANAL-TWO
006350 01   LANG-UNDERLINE.                                                         ANAL-TWO
006400      05  FILLER                          PIC X(65) VALUE SPACES.             ANAL-TWO
006450      05  FILLER                          PIC X(30) VALUE ALL '_'.            ANAL-TWO
006500      05  FILLER                          PIC X(38) VALUE SPACES.             ANAL-TWO
006550 01   OUTPT-ONE-B.                                                            ANAL-TWO
006600      05  FILLER                          PIC X(43) VALUE SPACES.             ANAL-TWO
006650      05  FILLER                          PIC X(48) VALUE ALL '_'.            ANAL-TWO
006700      05  FILLER                          PIC X(42) VALUE SPACES.             ANAL-TWO
006750 01   OUTPT-ONE-C.                                                            ANAL-TWO
006800      05  FILLER                          PIC X(37) VALUE SPACES.             ANAL-TWO
006850      05  FILLER                          PIC X(25) VALUE 'LETTER'.           ANAL-TWO
006900      05  FILLER                          PIC X(25) VALUE 'FREQUENCY'.        ANAL-TWO
006950      05  FILLER                          PIC X(46) VALUE 'PROBABILITY'.      ANAL-TWO
007000 01   OUTPT-ONE-D.                                                            ANAL-TWO
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007050      05  FILLER                    PIC X(37) VALUE SPACES.          ANAL-TWO
007100      05  FILLER                    PIC X(61) VALUE ALL '_'.         ANAL-TWO
007150      05  FILLER                    PIC X(35) VALUE SPACES.          ANAL-TWO
007200 01   OUTPT-ONE-E.                                                   ANAL-TWO
007250      05  FILLER                    PIC X(40) VALUE SPACES.          ANAL-TWO
007300      05  LTR-ONE                   PIC X.                           ANAL-TWO
007350      05  FILLER                    PIC X(22) VALUE SPACES.          ANAL-TWO
007400      05  FREQ-ONE                  PIC ZZZ,ZZ9.                     ANAL-TWO
007450      05  FILLER                    PIC X(19) VALUE SPACES.          ANAL-TWO
007500      05  PROB-ONE                  PIC 9.99999.                     ANAL-TWO
007550      05  FILLER                    PIC X(37) VALUE SPACES.          ANAL-TWO
007600 01   OUTPT-ONE-F.                                                   ANAL-TWO
007650      05  FILLER                    PIC X(38) VALUE SPACES.          ANAL-TWO
007700      05  FILLER                    PIC X(22) VALUE 'TOTAL'.         ANAL-TWO
007750      05  ONE-F-ILF-TLT             PIC ZZ,ZZZ,ZZ9.                  ANAL-TWO
007800      05  FILLER                    PIC X(63) VALUE SPACES.          ANAL-TWO
007850 01   OUTPT-TWO-A.                                                   ANAL-TWO
007900      05  FILLER                    PIC X(46) VALUE SPACES.          ANAL-TWO
007950      05  FILLER                    PIC X(87) VALUE 'FREQUENCY AND PRANAL-TWO
008000-     'OBABILITY OF (X(2)/X(1))'.                                     ANAL-TWO
008050 01   OUTPT-TWO-THREE-B.                                             ANAL-TWO
008100      05  FILLER                    PIC X(46) VALUE SPACES.          ANAL-TWO
008150      05  FILLER                    PIC X(40) VALUE ALL '_'.         ANAL-TWO
008200      05  FILLER                    PIC X(47) VALUE SPACES.          ANAL-TWO
008250 01   FIRST-LTR-OUTPT.                                               ANAL-TWO
008300      05  FILLER                    PIC X(31) VALUE SPACES.          ANAL-TWO
008350      05  FILLER                    PIC X(102) VALUE '**********FIRSTANAL-TWO
008400-     ' LETTER, X(1)**********'.                                      ANAL-TWO
008450 01   FIRST-LTR-TITLES.                                              ANAL-TWO
008500      05  FILLER                    PIC X(14) VALUE SPACES.          ANAL-TWO
008550      05  FIRST-LTR                 PIC X(9), OCCURS 13 TIMES.       ANAL-TWO
008600      05  FILLER                    PIC XX VALUE SPACES.             ANAL-TWO
008650 01   DEPN-FREQ-LINE.                                                ANAL-TWO
008700      05  FILLER                    PIC X(5) VALUE SPACES.           ANAL-TWO
008750      05  FREQ-ROW-LTR              PIC X.                           ANAL-TWO
008800      05  FILLER                    PIC XXX VALUE '(F)'.             ANAL-TWO
008850      05  DEPN-FREQ                 PIC BBZZZ,ZZ9 OCCURS 13 TIMES.   ANAL-TWO
008900      05  FILLER                    PIC X(7) VALUE SPACES.           ANAL-TWO
008950 01   DEPN-PROB-LINE.                                               ANAL-TWO
009000      05  FILLER                    PIC X(5) VALUE SPACES.           ANAL-TWO
009050      05  PROB-ROW-LTR              PIC X.                           ANAL-TWO
009100      05  FILLER                    PIC XXX VALUE '(P)'.             ANAL-TWO
009150      05  DEPN-PROB                 PIC BB9.99999  OCCURS 13 TIMES.  ANAL-TWO
009200      05  FILLER                    PIC X(7) VALUE SPACES.           ANAL-TWO
009250 01   OUTPT-THREE-A.                                                 ANAL-TWO
009300      05  FILLER                    PIC X(46) VALUE SPACES.          ANAL-TWO
009350      05  FILLER                    PIC X(87) VALUE 'FREQUENCY AND PRANAL-TWO
009400-     'OBABILITY OF (X(3)/X(1))'.                                     ANAL-TWO
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009450 01  OUTPT-FOUR-A.                                                  ANAL-TWO
009500     05  FILLER                    PIC X(47) VALUE SPACES.          ANAL-TWO
009550     05  FILLER                    PIC X(33) VALUE 'P(VOWEL/VOWEL)'.ANAL-TWO
009600     05  P-VOW-VOW                 PIC 9.99999.                     ANAL-TWO
009650     05  FILLER                    PIC X(46) VALUE SPACES.          ANAL-TWO
009700 01  OUTPT-FOUR-B.                                                  ANAL-TWO
009750     05  FILLER                    PIC X(47) VALUE SPACES.          ANAL-TWO
009800     05  FILLER                    PIC X(33) VALUE 'P(CONSONANT/VOWEANAL-TWO
009850-    'L)'.                                                          ANAL-TWO
009900     05  P-CONS-VOW                PIC 9.99999.                     ANAL-TWO
009950     05  FILLER                    PIC X(46) VALUE SPACES.          ANAL-TWO
010000 01  OUTPT-FOUR-C.                                                  ANAL-TWO
010050     05  FILLER                    PIC X(47) VALUE SPACES.          ANAL-TWO
010100     05  FILLER                    PIC X(33) VALUE 'P(VOWEL/CONSONANANAL-TWO
010150-    'T)'.                                                          ANAL-TWO
010200     05  P-VOW-CONS                PIC 9.99999.                     ANAL-TWO
010250     05  FILLER                    PIC X(46) VALUE SPACES.          ANAL-TWO
010300 01  OUTPT-FOUR-D.                                                  ANAL-TWO
010350     05  FILLER                    PIC X(47) VALUE SPACES.          ANAL-TWO
010400     05  FILLER                    PIC X(33) VALUE 'P(CONSONANT/CONSANAL-TWO
010450-    'ONANT)'.                                                      ANAL-TWO
010500     05  P-CONS-CONS               PIC 9.99999.                     ANAL-TWO
010550     05  FILLER                    PIC X(46) VALUE SPACES.          ANAL-TWO
010600 01  OUTPT-FOUR-E.                                                  ANAL-TWO
010650     05  FILLER                    PIC X(11) VALUE SPACES.          ANAL-TWO
010700     05  FILLER                    PIC X(32) VALUE 'YULE-S CHARACTERANAL-TWO
010750-    'ISTIC, K, FOR:'.                                              ANAL-TWO
010800     05  OUTPT-FOUR-LANG           PIC X(30).                       ANAL-TWO
010850     05  YULES-K                   PIC Z(12)9.999.                  ANAL-TWO
010900     05  FILLER                    PIC X(40) VALUE SPACES.          ANAL-TWO
010950 01  OUTPT-FOUR-F.                                                  ANAL-TWO
011000     05  FILLER                    PIC X.                           ANAL-TWO
011050     05  FILLER                    PIC X(94) VALUE 'KOLMOGOROV-SMIRNANAL-TWO
011100-    'OV CUMULATED RELATIVE FREQUENCY TABLE FOR INDEPENDENT LETTERANAL-TWO
011150-    ' OCCURRENCES IN:'.                                            ANAL-TWO
011200     05  OUTPT-FOUR-KS-LANG        PIC X(30).                       ANAL-TWO
011250     05  FILLER                    PIC X(8) VALUE SPACES.           ANAL-TWO
011300 01  OUTPT-FOUR-G.                                                  ANAL-TWO
011350     05  FILLER                    PIC X(37) VALUE SPACES.          ANAL-TWO
011400     05  FILLER                    PIC X(25) VALUE 'LETTER'.        ANAL-TWO
011450     05  FILLER                    PIC X(71) VALUE 'CUM. REL. FREQ'.ANAL-TWO
011500 01  KS-LINE.                                                       ANAL-TWO
011550     05  FILLER                    PIC X(40) VALUE SPACES.          ANAL-TWO
011600     05  KS-LTR                    PIC X.                           ANAL-TWO
011650     05  FILLER                    PIC X(25) VALUE SPACES.          ANAL-TWO
011700     05  KS-CRF                    PIC 9.99999.                     ANAL-TWO
011750     05  FILLER                    PIC X(60) VALUE SPACES.          ANAL-TWO
011800 01  ERROR-LINE.                                                    ANAL-TWO
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011850      05  FILLER                    PIC X.                                  ANAL-TWO
011900      05  FILLER                    PIC X(28) VALUE 'OVERFLOW ERROR AANAL-TWO
011950-     'T STATEMENT '.                                                        ANAL-TWO
012000      05  ER-STEP                   PIC 9(6).                               ANAL-TWO
012050      05  FILLER                    PIC X(21) VALUE ' CARD IN PROCESSANAL-TWO
012100-     ' WAS '.                                                               ANAL-TWO
012150      05  ER-CARD                   PIC 9(6).                               ANAL-TWO
012200      05  FILLER                    PIC X(71) VALUE ALL '*'.                ANAL-TWO
012250 01   DATA-FORM.                                                             ANAL-TWO
012300      05  CL                        PIC X, OCCURS 73 TIMES.                 ANAL-TWO
012350 01   OUTPT-FIVE-A.                                                          ANAL-TWO
012400      05  FILLER                    PIC X(49) VALUE SPACES.                 ANAL-TWO
012450      05  FILLER                    PIC X(37) VALUE 'JOINT PROBABILITANAL-TWO
012500-     'Y TABLE FOR X(1)-X(2)'.                                               ANAL-TWO
012550      05  FILLER                    PIC X(47) VALUE SPACES.                 ANAL-TWO
012600 01   OUTPT-FIVE-B.                                                          ANAL-TWO
012650      05  FILLER                    PIC X(11) VALUE SPACES.                 ANAL-TWO
012700      05  FILLER                    PIC X(25) VALUE 'YULES K FOR X(1)ANAL-TWO
012750-     '-X(2):'.                                                              ANAL-TWO
012800      05  YULES-K-2                 PIC Z(12)9.999.                         ANAL-TWO
012850      05  FILLER                    PIC X(80) VALUE SPACES.                 ANAL-TWO
012900 01   OUTPT-SIX-A.                                                           ANAL-TWO
012950      05  FILLER                    PIC X(49) VALUE SPACES.                 ANAL-TWO
013000      05  FILLER                    PIC X(37) VALUE 'JOINT PROBABILITANAL-TWO
013050-     'Y TABLE FOR X(1)-X(3)'.                                               ANAL-TWO
013100      05  FILLER                    PIC X(47) VALUE SPACES.                 ANAL-TWO
013150 01   OUTPT-SIX-B.                                                           ANAL-TWO
013200      05  FILLER                    PIC X(11) VALUE SPACES.                 ANAL-TWO
013250      05  FILLER                    PIC X(25) VALUE 'YULES K FOR X(1)ANAL-TWO
013300-     '-X(3):'.                                                              ANAL-TWO
013350      05  YULES-K-3                 PIC Z(12)9.999.                         ANAL-TWO
013400      05  FILLER                    PIC X(80) VALUE SPACES.                 ANAL-TWO
013450 01   CARD-FILL.                                                             ANAL-TWO
013500      05  TEST                      PIC X.                                  ANAL-TWO
013550      05  SEQ-NR                    PIC 999.                                ANAL-TWO
013600      05  LANG-ID                   PIC X(10).                              ANAL-TWO
013650      05  CRF-OUT                   PIC 9V9(5), OCCURS 11 TIMES.            ANAL-TWO
013700 01   LAST-CARD-FILL.                                                        ANAL-TWO
013750      05  L-TEST                    PIC X.                                  ANAL-TWO
013800      05  L-SEQ-NR                  PIC 999.                                ANAL-TWO
013850      05  L-LANG-ID                 PIC X(10).                              ANAL-TWO
013900      05  L-CRF-OUT                 PIC 9V9(5).                             ANAL-TWO
013950      05  FILLER                    PIC X(60) VALUE SPACES.                 ANAL-TWO
014000 PROCEDURE DIVISION.                                                         ANAL-TWO
014050 START-UP.                                                                   ANAL-TWO
014100      OPEN INPUT POPULATION, OUTPUT LANG-ANAL, CARD-FILE.                   ANAL-TWO
014150 ALPHA.                                                                      ANAL-TWO
014200      PERFORM READ-A-CARD.                                                  ANAL-TWO
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014250      MOVE 3 TO N.                                                ANAL-TWO
014300 BRAVO.                                                           ANAL-TWO
014350      IF CL (N) = SPACE GO TO CK-ONE.                             ANAL-TWO
014400      PERFORM FIRST-LETTER-CHECK THRU FIRST-EXIT.                 ANAL-TWO
014450      IF MATCH = ZERO GO TO CK-ONE.                               ANAL-TWO
014500      ADD 1 TO ILF (A) ON SIZE ERROR GO TO E-1.                   ANAL-TWO
014550      COMPUTE M = N + 1.                                          ANAL-TWO
014600      IF M = 73 PERFORM SHIFT-TWO.                                ANAL-TWO
014650      IF CL (M) = SPACE GO TO CK-TWO.                             ANAL-TWO
014700      PERFORM SECOND-LETTER-CHECK THRU SECOND-EXIT.               ANAL-TWO
014750      IF MATCH = ZERO GO TO CK-TWO.                               ANAL-TWO
014800 CHARLIE.                                                         ANAL-TWO
014850      ADD 1 TO FOL-FREQ (A, B) ON SIZE ERROR GO TO E-2.           ANAL-TWO
014900      PERFORM VC-TALLEY THRU VC-EXIT.                             ANAL-TWO
014950      COMPUTE L = N + 2.                                          ANAL-TWO
015000      IF L = 73 AND CL (73) = '-' PERFORM SHIFT-THREE.            ANAL-TWO
015050      IF L = 73 AND CL (73) NOT = '-' PERFORM ALT-THREE.          ANAL-TWO
015100      IF CL (L) = SPACE GO TO CK-THREE.                           ANAL-TWO
015150      PERFORM THIRD-LETTER-CHECK THRU THIRD-EXIT.                 ANAL-TWO
015200      IF MATCH = ZERO GO TO CK-THREE.                             ANAL-TWO
015250 DELTA.                                                           ANAL-TWO
015300      COMPUTE B = B + 34.                                         ANAL-TWO
015350      ADD 1 TO FOL-FREQ (A, B) ON SIZE ERROR GO TO E-3.           ANAL-TWO
015400 ECHO.                                                            ANAL-TWO
015450      ADD 1 TO N.                                                 ANAL-TWO
015500      GO TO BRAVO.                                                ANAL-TWO
015550 CK-ONE.                                                          ANAL-TWO
015600      ADD 1 TO ILF (34) ON SIZE ERROR GO TO E-4.                  ANAL-TWO
015650      ADD 1 TO N.                                                 ANAL-TWO
015700      MOVE 34 TO A.                                               ANAL-TWO
015750 CK-ONE-ALPHA.                                                    ANAL-TWO
015800      IF N = 73 PERFORM SHIFT-ONE.                                ANAL-TWO
015850      IF CL (N) = SPACE GO TO CK-ONE-BRAVO.                       ANAL-TWO
015900      COMPUTE N = N - 1.                                          ANAL-TWO
015950      PERFORM SECOND-LETTER-CHECK THRU SECOND-EXIT.               ANAL-TWO
016000      IF MATCH = 1 GO TO CHARLIE, ELSE ADD 1 TO N.                ANAL-TWO
016050 CK-ONE-BRAVO.                                                    ANAL-TWO
016100      ADD 1 TO N.                                                 ANAL-TWO
016150      GO TO CK-ONE-ALPHA.                                         ANAL-TWO
016200 CK-TWO.                                                          ANAL-TWO
016250      ADD 1 TO FOL-FREQ (A, 34) ON SIZE ERROR GO TO E-5.          ANAL-TWO
016300      ADD 1 TO N.                                                 ANAL-TWO
016350 CK-TWO-ALPHA.                                                    ANAL-TWO
016400      COMPUTE M = N + 1.                                          ANAL-TWO
016450      IF M = 73 PERFORM SHIFT-TWO.                                ANAL-TWO
016500      IF CL (M) = SPACE GO TO CK-TWO-BRAVO.                       ANAL-TWO
016550      COMPUTE N = N - 1.                                          ANAL-TWO
016600      PERFORM THIRD-LETTER-CHECK THRU THIRD-EXIT.                 ANAL-TWO
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016650      IF MATCH = 1 GO TO DELTA, ELSE ADD 1 TO N.                    ANAL-TWO
016700 CK-TWO-BRAVO.                                                      ANAL-TWO
016750      ADD 1 TO N.                                                   ANAL-TWO
016800      GO TO CK-TWO-ALPHA.                                           ANAL-TWO
016850 CK-THREE.                                                          ANAL-TWO
016900      ADD 1 TO FOL-FREQ (A, 68) ON SIZE ERROR GO TO E-6.            ANAL-TWO
016950      GO TO ECHO.                                                   ANAL-TWO
017000 SHIFT-ONE.                                                         ANAL-TWO
017050      PERFORM READ-A-CARD.                                          ANAL-TWO
017100      MOVE SPACES TO CL (1), CL (2).                                ANAL-TWO
017150      MOVE 3 TO N.                                                  ANAL-TWO
017200 SHIFT-TWO.                                                         ANAL-TWO
017250      MOVE CL (72) TO CL (2).                                       ANAL-TWO
017300      PERFORM READ-A-CARD.                                          ANAL-TWO
017350      MOVE 2 TO N.                                                  ANAL-TWO
017400      MOVE 3 TO M.                                                  ANAL-TWO
017450 SHIFT-THREE.                                                       ANAL-TWO
017500      MOVE CL (72) TO CL (2).                                       ANAL-TWO
017550      PERFORM READ-A-CARD.                                          ANAL-TWO
017600      MOVE 1 TO N.                                                  ANAL-TWO
017650      MOVE 3 TO L.                                                  ANAL-TWO
017700 ALT-THREE.                                                         ANAL-TWO
017750      MOVE CL (72) TO CL (1).                                       ANAL-TWO
017800      MOVE SPACES TO CL (2).                                        ANAL-TWO
017850      PERFORM READ-A-CARD.                                          ANAL-TWO
017900      MOVE 0 TO N.                                                  ANAL-TWO
017950      MOVE 2 TO L.                                                  ANAL-TWO
018000 READ-A-CARD.                                                       ANAL-TWO
018050      READ POPULATION AT END GO TO EOJ.                             ANAL-TWO
018100      IF NEW-LANG GO TO FLUSH.                                      ANAL-TWO
018150      ADD 1 TO CARD-NR ON SIZE ERROR GO TO E-7.                     ANAL-TWO
018200      PERFORM DAT-SHIFT VARYING X FROM 1 BY 1 UNTIL X > 71.         ANAL-TWO
018250 DAT-SHIFT.                                                         ANAL-TWO
018300      COMPUTE Y = X + 2.                                            ANAL-TWO
018350      MOVE CC (X) TO CL (Y).                                        ANAL-TWO
018400 FLUSH.                                                             ANAL-TWO
018450      IF CARD-NR NOT = ZERO PERFORM CLOSE-OUT-RT.                   ANAL-TWO
018500      PERFORM INITIALIZE-RT.                                        ANAL-TWO
018550      GO TO ALPHA.                                                  ANAL-TWO
018600 EOJ.                                                               ANAL-TWO
018650      PERFORM CLOSE-OUT-RT.                                         ANAL-TWO
018700      PERFORM LOOP-RT 5 TIMES.                                      ANAL-TWO
018750      MOVE SPACES TO PRINT-LINE.                                    ANAL-TWO
018800      WRITE PRINT-LINE AFTER TOP-OF-PAGE.                           ANAL-TWO
018850      CLOSE POPULATION, LANG-ANAL, CARD-FILE.                       ANAL-TWO
018900      STOP RUN.                                                     ANAL-TWO
018950 LOOP-RT.                                                           ANAL-TWO
019000      MOVE SPACES TO PRINT-LINE.                                    ANAL-TWO
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019050     WRITE PRINT-LINE AFTER 1.                                    ANAL-TWO
019100 FIRST-LETTER-CHECK.                                              ANAL-TWO
019150     MOVE 1 TO A.                                                 ANAL-TWO
019200     MOVE ZERO TO MATCH.                                          ANAL-TWO
019250 FLC-ALPHA.                                                       ANAL-TWO
019300     IF CL (N) = LTR (A) GO TO FLC-BRAVO.                         ANAL-TWO
019350     IF A = 33 GO TO FIRST-EXIT.                                  ANAL-TWO
019400     ADD 1 TO A.                                                  ANAL-TWO
019450     GO TO FLC-ALPHA.                                             ANAL-TWO
019500 FLC-BRAVO.                                                       ANAL-TWO
019550     MOVE 1 TO MATCH.                                             ANAL-TWO
019600 FIRST-EXIT.  EXIT.                                               ANAL-TWO
019650 SECOND-LETTER-CHECK.                                             ANAL-TWO
019700     MOVE 1 TO B.                                                 ANAL-TWO
019750     MOVE ZERO TO MATCH.                                          ANAL-TWO
019800     COMPUTE M = N + 1.                                           ANAL-TWO
019850 SLC-ALPHA.                                                       ANAL-TWO
019900     IF CL (M) = LTR (B) GO TO SLC-BRAVO.                         ANAL-TWO
019950     IF B = 33 GO TO SECOND-EXIT.                                 ANAL-TWO
020000     ADD 1 TO B.                                                  ANAL-TWO
020050     GO TO SLC-ALPHA.                                             ANAL-TWO
020100 SLC-BRAVO.                                                       ANAL-TWO
020150     MOVE 1 TO MATCH.                                             ANAL-TWO
020200 SECOND-EXIT.  EXIT.                                              ANAL-TWO
020250 THIRD-LETTER-CHECK.                                              ANAL-TWO
020300     MOVE 1 TO B.                                                 ANAL-TWO
020350     MOVE ZERO TO MATCH.                                          ANAL-TWO
020400     COMPUTE L = N + 2.                                           ANAL-TWO
020450 TLC-ALPHA.                                                       ANAL-TWO
020500     IF CL (L) = LTR (B) GO TO TLC-BRAVO.                         ANAL-TWO
020550     IF B = 33 GO TO THIRD-EXIT.                                  ANAL-TWO
020600     ADD 1 TO B.                                                  ANAL-TWO
020650     GO TO TLC-ALPHA.                                             ANAL-TWO
020700 TLC-BRAVO.                                                       ANAL-TWO
020750     MOVE 1 TO MATCH.                                             ANAL-TWO
020800 THIRD-EXIT.  EXIT.                                               ANAL-TWO
020850 VC-TALLEY.                                                       ANAL-TWO
020900     IF A = 34 GO TO VC-EXIT.                                     ANAL-TWO
020950     IF A < 11 AND B < 11 ADD 1 TO F-VOW-VOW SIZE ERROR GO TO E-8.ANAL-TWO
021000     IF A < 11 AND B NOT < 11 ADD 1 TO F-CONS-VOW ON SIZE         ANAL-TWO
021050          ERROR GO TO E-9.                                        ANAL-TWO
021100     IF A NOT < 11 AND B < 11 ADD 1 TO F-VOW-CONS ON SIZE         ANAL-TWO
021150          ERROR GO TO E-10.                                       ANAL-TWO
021200     IF A NOT < 11 AND B NOT < 11 ADD 1 TO F-CONS-CONS ON SIZE    ANAL-TWO
021250          ERROR GO TO E-11.                                       ANAL-TWO
021300 VC-EXIT.  EXIT.                                                  ANAL-TWO
021350 INITIALIZE-RT.                                                   ANAL-TWO
021400     MOVE ZEROS TO VC-TOTAL, A, B, L, M, N, X, Y, F-CONS-CONS,    ANAL-TWO
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021450          F-VOW-CONS, F-CONS-VOW, F-VOW-VOW, FOL-FREQ-TOTAL, S,     ANAL-TWO
021500          ILF-TOTAL, CRF-TOTAL, CARD-NR, WS-SEQ-NR.                 ANAL-TWO
021550      PERFORM ZEROING-ONE VARYING A FROM 1 BY 1 UNTIL A > 34.       ANAL-TWO
021600      PERFORM ZEROING-TWO VARYING A FROM 1 BY 1 UNTIL A > 34        ANAL-TWO
021650          AFTER B FROM 1 BY 1 UNTIL B > 68.                         ANAL-TWO
021700      MOVE LANGUAGE TO LANG-DESIG, OUTPT-FOUR-LANG,                 ANAL-TWO
021750          OUTPT-FOUR-KS-LANG.                                       ANAL-TWO
021800      MOVE LANG-KEY TO LANG-ID, L-LANG-ID.                          ANAL-TWO
021850 CLOSE-OUT-RT.                                                      ANAL-TWO
021900      SUBTRACT 1 FROM ILF (34).                                     ANAL-TWO
021950      PERFORM IND-TOTAL-CALC VARYING A FROM 1 BY 1 UNTIL A > 34.    ANAL-TWO
022000      PERFORM IND-PROB-CALC VARYING A FROM 1 BY 1 UNTIL A > 34.     ANAL-TWO
022050      PERFORM OUTPT-ONE-PREP.                                       ANAL-TWO
022100      PERFORM OUTPT-ONE-PRINT VARYING A FROM 1 BY 1 UNTIL A > 34.   ANAL-TWO
022150      MOVE ILF-TOTAL TO ONE-F-ILF-TLT.                              ANAL-TWO
022200      WRITE PRINT-LINE FROM OUTPT-ONE-F BEFORE 1.                   ANAL-TWO
022250      PERFORM DEPN-TWO-CALC VARYING A FROM 1 BY 1 UNTIL A > 34.     ANAL-TWO
022300      PERFOPM OUTPT-TWO-PREP.                                       ANAL-TWO
022350      PERFORM COL-TITLES-A VARYING A FROM 1 BY 1 UNTIL A > 13.      ANAL-TWO
022400      WRITE PRINT-LINE FROM FIRST-LTR-TITLES BEFORE 2.              ANAL-TWO
022450      PERFORM OUTPT-TWO-DUMP-A VARYING B FROM 1 BY 1 UNTIL B > 23.  ANAL-TWO
022500      PERFORM OUTPT-TWO-PREP.                                       ANAL-TWO
022550      PERFORM COL-TITLES-B VARYING A FROM 14 BY 1 UNTIL A > 26.     ANAL-TWO
022600      WRITE PRINT-LINE FROM FIRST-LTR-TITLES BEFORE 2.              ANAL-TWO
022650      PERFORM OUTPT-TWO-DUMP-B VARYING B FROM 1 BY 1 UNTIL B > 23.  ANAL-TWO
022700      PERFORM OUTPT-TWO-PREP.                                       ANAL-TWO
022750      PERFORM FLUSHING VARYING A FROM 1 BY 1 UNTIL A > 13.          ANAL-TWO
022800      PERFORM COL-TITLES-C VARYING A FROM 27 BY 1 UNTIL A > 34.     ANAL-TWO
022850      WRITE PRINT-LINE FROM FIRST-LTR-TITLES BEFORE 2.              ANAL-TWO
022900      PERFORM OUTPT-TWO-DUMP-C VARYING B FROM 1 BY 1 UNTIL B > 23.  ANAL-TWO
022950      PERFORM OUTPT-TWO-PREP.                                       ANAL-TWO
023000      PERFORM COL-TITLES-A VARYING A FROM 1 BY 1 UNTIL A > 13.      ANAL-TWO
023050      WRITE PRINT-LINE FROM FIRST-LTR-TITLES BEFORE 2.              ANAL-TWO
023100      PERFORM OUTPT-TWO-DUMP-A VARYING B FROM 24 BY 1 UNTIL B > 34.ANAL-TWO
023150      PERFORM OUTPT-TWO-PREP.                                       ANAL-TWO
023200      PERFORM COL-TITLES-B VARYING A FROM 14 BY 1 UNTIL A > 26.     ANAL-TWO
023250      WRITE PRINT-LINE FROM FIRST-LTR-TITLES BEFORE 2.              ANAL-TWO
023300      PERFORM OUTPT-TWO-DUMP-B VARYING B FROM 24 BY 1 UNTIL B > 34.ANAL-TWO
023350      PERFORM OUTPT-TWO-PREP.                                       ANAL-TWO
023400      PERFORM FLUSHING VARYING A FROM 1 BY 1 UNTIL A > 13.          ANAL-TWO
023450      PERFORM COL-TITLES-C VARYING A FROM 27 BY 1 UNTIL A > 34.     ANAL-TWO
023500      WRITE PRINT-LINE FROM FIRST-LTR-TITLES BEFORE 2.              ANAL-TWO
023550      PERFORM OUTPT-TWO-DUMP-C VARYING B FROM 24 BY 1 UNTIL B > 34.ANAL-TWO
023600      PERFORM DEPN-THREE-CALC VARYING A FROM 1 BY 1 UNTIL A > 34.   ANAL-TWO
023650      PERFORM OUTPT-THREE-PREP.                                     ANAL-TWO
023700      PERFORM COL-TITLES-A VARYING A FROM 1 BY 1 UNTIL A > 13.      ANAL-TWO
023750      WRITE PRINT-LINE FROM FIRST-LTR-TITLES BEFORE 2.              ANAL-TWO
023800      PERFORM OUTPT-TWO-DUMP-A VARYING B FROM 35 BY 1 UNTIL B > 57.ANAL-TWO
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023850      PERFORM OUTPT-THREE-PREP.                                   ANAL-TWO
023900      PERFORM COL-TITLES-B VARYING A FROM 14 BY 1 UNTIL A > 26.   ANAL-TWO
023950      WRITE PRINT-LINE FROM FIRST-LTR-TITLES BEFORE 2.            ANAL-TWO
024000      PERFORM OUTPT-TWO-DUMP-B VARYING B FROM 35 BY 1 UNTIL B > 57.ANAL-TWO
024050      PERFORM OUTPT-THREE-PREP.                                   ANAL-TWO
024100      PERFORM FLUSHING VARYING A FROM 1 BY 1 UNTIL A > 13.        ANAL-TWO
024150      PERFORM COL-TITLES-C VARYING A FROM 27 BY 1 UNTIL A > 34.   ANAL-TWO
024200      WRITE PRINT-LINE FROM FIRST-LTR-TITLES BEFORE 2.            ANAL-TWO
024250      PERFORM OUTPT-TWO-DUMP-C VARYING B FROM 35 BY 1 UNTIL B > 57.ANAL-TWO
024300      PERFORM OUTPT-THREE-PREP.                                   ANAL-TWO
024350      PERFORM COL-TITLES-A VARYING A FROM 1 BY 1 UNTIL A > 13.    ANAL-TWO
024400      WRITE PRINT-LINE FROM FIRST-LTR-TITLES BEFORE 2.            ANAL-TWO
024450      PERFORM OUTPT-TWO-DUMP-A VARYING B FROM 58 BY 1 UNTIL B > 68.ANAL-TWO
024500      PERFORM OUTPT-THREE-PREP.                                   ANAL-TWO
024550      PERFORM COL-TITLES-B VARYING A FROM 14 BY 1 UNTIL A > 26.   ANAL-TWO
024600      WRITE PRINT-LINE FROM FIRST-LTR-TITLES BEFORE 2.            ANAL-TWO
024650      PERFORM OUTPT-TWO-DUMP-B VARYING B FROM 58 BY 1 UNTIL B > 68.ANAL-TWO
024700      PERFORM OUTPT-THREE-PREP.                                   ANAL-TWO
024750      PERFORM FLUSHING VARYING A FROM 1 BY 1 UNTIL A > 13.        ANAL-TWO
024800      PERFORM COL-TITLES-C VARYING A FROM 27 BY 1 UNTIL A > 34.   ANAL-TWO
024850      WRITE PRINT-LINE FROM FIRST-LTR-TITLES BEFORE 2.            ANAL-TWO
024900      PERFORM OUTPT-TWO-DUMP-C VARYING B FROM 58 BY 1 UNTIL B > 68.ANAL-TWO
024950      PERFORM VC-DUMP.                                            ANAL-TWO
025000      PERFORM YULE-PREP VARYING A FROM 1 BY 1 UNTIL A > 34.       ANAL-TWO
025050      COMPUTE YULES-K ROUNDED = (10000 * (S - ILF-TOTAL)) /       ANAL-TWO
025100          (ILF-TOTAL ** 2).                                       ANAL-TWO
025150      WRITE PRINT-LINE FROM OUTPT-FOUR-E BEFORE 4.                ANAL-TWO
025200      WRITE PRINT-LINE FROM OUTPT-FOUR-F BEFORE 2.                ANAL-TWO
025250      WRITE PRINT-LINE FROM OUTPT-FOUR-G BEFORE 2.                ANAL-TWO
025300      PERFORM KS-CALC VARYING A FROM 1 BY 1 UNTIL A > 34.         ANAL-TWO
025350      MOVE ZEROS TO FOL-FREQ-TOTAL.                               ANAL-TWO
025400      PERFORM DEPN-TWO-SUM VARYING A FROM 1 BY 1 UNTIL A > 34     ANAL-TWO
025450          AFTER B FROM 1 BY 1 UNTIL B > 34.                       ANAL-TWO
025500      PERFORM DEPN-TWO-PROB VARYING A FROM 1 BY 1 UNTIL A > 34    ANAL-TWO
025550          AFTER B FROM 1 BY 1 UNTIL B > 34.                       ANAL-TWO
025600      PERFORM OUTPT-FIVE-PREP.                                    ANAL-TWO
025650      PERFORM COL-TITLES-A VARYING A FROM 1 BY 1 UNTIL A > 13.    ANAL-TWO
025700      WRITE PRINT-LINE FROM FIRST-LTR-TITLES BEFORE 2.            ANAL-TWO
025750      PERFORM OUTPT-DUMP-D VARYING B FROM 1 BY 1 UNTIL B > 34.    ANAL-TWO
025800      PERFORM OUTPT-FIVE-PREP.                                    ANAL-TWO
025850      PERFORM COL-TITLES-B VARYING A FROM 14 BY 1 UNTIL A > 26.   ANAL-TWO
025900      WRITE PRINT-LINE FROM FIRST-LTR-TITLES BEFORE 2.            ANAL-TWO
025950      PERFORM OUTPT-DUMP-E VARYING B FROM 1 BY 1 UNTIL B > 34.    ANAL-TWO
026000      PERFORM OUTPT-FIVE-PREP.                                    ANAL-TWO
026050      PERFORM FLUSHING VARYING A FROM 1 BY 1 UNTIL A > 13.        ANAL-TWO
026100      PERFORM COL-TITLES-C VARYING A FROM 27 BY 1 UNTIL A > 34.   ANAL-TWO
026150      WRITE PRINT-LINE FROM FIRST-LTR-TITLES BEFORE 2.            ANAL-TWO
026200      PERFORM OUTPT-DUMP-F VARYING B FROM 1 BY 1 UNTIL B > 34.    ANAL-TWO
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026250      MOVE ZEROS TO S.                                                ANAL-TWO
026300      PERFORM YULES-K-PREP VARYING A FROM 1 BY 1 UNTIL A > 34         ANAL-TWO
026350          AFTER B FROM 1 BY 1 UNTIL B > 34.                           ANAL-TWO
026400      COMPUTE YULES-K-2 ROUNDED = (10000 * (S - FOL-FREQ-TOTAL)) /    ANAL-TWO
026450          (FOL-FREQ-TOTAL ** 2).                                      ANAL-TWO
026500      WRITE PRINT-LINE FROM OUTPT-FIVE-B BEFORE 1.                    ANAL-TWO
026550      MOVE ZEROS TO CRF-TOTAL, WS-SEQ-NR, L.                          ANAL-TWO
026600      MOVE 'E' TO TEST, L-TEST.                                       ANAL-TWO
026650      PERFORM CARD-DUMP VARYING A FROM 1 BY 1 UNTIL A > 34            ANAL-TWO
026700          AFTER B FROM 1 BY 1 UNTIL B > 34.                           ANAL-TWO
026750      MOVE ZEROS TO FOL-FREQ-TOTAL.                                   ANAL-TWO
026800      PERFORM DEPN-TWO-SUM VARYING A FROM 1 BY 1 UNTIL A > 34         ANAL-TWO
026850          AFTER B FROM 35 BY 1 UNTIL B > 68.                          ANAL-TWO
026900      PERFORM DEPN-TWO-PROB VARYING A FROM 1 BY 1 UNTIL A > 34        ANAL-TWO
026950          AFTER B FROM 35 BY 1 UNTIL B > 68.                          ANAL-TWO
027000      PERFORM OUTPT-SIX-PREP.                                         ANAL-TWO
027050      PERFORM COL-TITLES-A VARYING A FROM 1 BY 1 UNTIL A > 13.        ANAL-TWO
027100      WRITE PRINT-LINE FROM FIRST-LTR-TITLES BEFORE 2.                ANAL-TWO
027150      PERFORM OUTPT-DUMP-D VARYING B FROM 35 BY 1 UNTIL B > 68.       ANAL-TWO
027200      PERFORM OUTPT-SIX-PREP.                                         ANAL-TWO
027250      PERFORM COL-TITLES-B VARYING A FROM 14 BY 1 UNTIL A > 26.       ANAL-TWO
027300      WRITE PRINT-LINE FROM FIRST-LTR-TITLES BEFORE 2.                ANAL-TWO
027350      PERFORM OUTPT-DUMP-E VARYING B FROM 35 BY 1 UNTIL B > 68.       ANAL-TWO
027400      PERFORM OUTPT-SIX-PREP.                                         ANAL-TWO
027450      PERFORM FLUSHING VARYING A FROM 1 BY 1 UNTIL A > 13.            ANAL-TWO
027500      PERFORM COL-TITLES-C VARYING A FROM 27 BY 1 UNTIL A > 34.       ANAL-TWO
027550      WRITE PRINT-LINE FROM FIRST-LTR-TITLES BEFORE 2.                ANAL-TWO
027600      PERFORM OUTPT-DUMP-F VARYING B FROM 35 BY 1 UNTIL B > 68.       ANAL-TWO
027650      MOVE ZEROS TO S.                                                ANAL-TWO
027700      PERFORM YULES-K-PREP VARYING A FROM 1 BY 1 UNTIL A > 34         ANAL-TWO
027750          AFTER B FROM 35 BY 1 UNTIL B > 68.                          ANAL-TWO
027800      COMPUTE YULES-K-3 ROUNDED = (10000 * (S - FOL-FREQ-TOTAL)) /    ANAL-TWO
027850          (FOL-FREQ-TOTAL ** 2).                                      ANAL-TWO
027900      WRITE PRINT-LINE FROM OUTPT-SIX-B BEFORE 1.                     ANAL-TWO
027950      MOVE ZEROS TO CRF-TOTAL, WS-SEQ-NR, L.                          ANAL-TWO
028000      MOVE 'F' TO TEST, L-TEST.                                       ANAL-TWO
028050      PERFORM CARD-DUMP VARYING A FROM 1 BY 1 UNTIL A > 34            ANAL-TWO
028100          AFTER B FROM 35 BY 1 UNTIL B > 68.                          ANAL-TWO
028150 IND-TOTAL-CALC.                                                      ANAL-TWO
028200      COMPUTE ILF-TOTAL = ILF-TOTAL + ILF (A).                        ANAL-TWO
028250 IND-PROB-CALC.                                                       ANAL-TWO
028300      IF ILF (A) > 0 COMPUTE ILP (A) ROUNDED =                        ANAL-TWO
028350          ILF (A) / ILF-TOTAL, ELSE MOVE ZEROS TO ILP (A).            ANAL-TWO
028400 DEPN-TWO-CALC.                                                       ANAL-TWO
028450      MOVE ZEROS TO FOL-FREQ-TOTAL.                                   ANAL-TWO
028500      PERFORM DEPN-TWO-SUM VARYING B FROM 1 BY 1 UNTIL B > 34.        ANAL-TWO
028550      PERFORM DEPN-TWO-PROB VARYING B FROM 1 BY 1 UNTIL B > 34.       ANAL-TWO
028600 DEPN-THREE-CALC.                                                     ANAL-TWO
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028650      MOVE ZEROS TO FOL-FREQ-TOTAL.                                   ANAL-TWO
028700      PERFORM DEPN-TWO-SUM VARYING B FROM 35 BY 1 UNTIL B > 68.       ANAL-TWO
028750      PERFORM DEPN-TWO-PROB VARYING B FROM 35 BY 1 UNTIL B > 68.      ANAL-TWO
028800 DEPN-TWO-SUM.                                                        ANAL-TWO
028850      COMPUTE FOL-FREQ-TOTAL = FOL-FREQ-TOTAL + FOL-FREQ (A, B).      ANAL-TWO
028900 DEPN-TWO-PROB.                                                       ANAL-TWO
028950      IF FOL-FREQ (A, B) > 0 COMPUTE FOL-PROB (A, B) ROUNDED =        ANAL-TWO
029000          (FOL-FREQ (A, B) / FOL-FREQ-TOTAL), ELSE MOVE ZEROS         ANAL-TWO
029050          TO FOL-PROB (A, B).                                         ANAL-TWO
029100 OUTPT-ONE-PREP.                                                      ANAL-TWO
029150      MOVE SPACES TO PRINT-LINE.                                      ANAL-TWO
029200      WRITE PRINT-LINE FROM OUTPT-ONE-A AFTER TOP-OF-PAGE.            ANAL-TWO
029250      WRITE PRINT-LINE FROM OUTPT-ONE-B BEFORE 1.                     ANAL-TWO
029300      WRITE PRINT-LINE FROM LANG-LINE AFTER 1.                        ANAL-TWO
029350      WRITE PRINT-LINE FROM LANG-UNDERLINE BEFORE 1.                  ANAL-TWO
029400      WRITE PRINT-LINE FROM OUTPT-ONE-C AFTER 2.                      ANAL-TWO
029450      WRITE PRINT-LINE FROM OUTPT-ONE-D BEFORE 2.                     ANAL-TWO
029500 OUTPT-ONE-PRINT.                                                     ANAL-TWO
029550      MOVE LTR (A) TO LTR-ONE.                                        ANAL-TWO
029600      MOVE ILF (A) TO FREQ-ONE.                                       ANAL-TWO
029650      MOVE ILP (A) TO PROB-ONE.                                       ANAL-TWO
029700      WRITE PRINT-LINE FROM OUTPT-ONE-E BEFORE 2.                     ANAL-TWO
029750 OUTPT-TWO-PREP.                                                      ANAL-TWO
029800      MOVE SPACES TO PRINT-LINE.                                      ANAL-TWO
029850      WRITE PRINT-LINE FROM OUTPT-TWO-A AFTER TOP-OF-PAGE.            ANAL-TWO
029900      WRITE PRINT-LINE FROM OUTPT-TWO-THREE-B BEFORE 1.               ANAL-TWO
029950      WRITE PRINT-LINE FROM LANG-LINE BEFORE 0.                       ANAL-TWO
030000      WRITE PRINT-LINE FROM LANG-UNDERLINE BEFORE 2.                  ANAL-TWO
030050      WRITE PRINT-LINE FROM FIRST-LTR-OUTPT BEFORE 2.                 ANAL-TWO
030100 COL-TITLES-A.                                                        ANAL-TWO
030150      MOVE LTR (A) TO FIRST-LTR (A).                                  ANAL-TWO
030200 OUTPT-TWO-DUMP-A.                                                    ANAL-TWO
030250      PERFORM DUMP-A VARYING A FROM 1 BY 1 UNTIL A > 13.              ANAL-TWO
030300      WRITE PRINT-LINE FROM DEPN-FREQ-LINE BEFORE 1.                  ANAL-TWO
030350      PERFORM DUMP-B VARYING A FROM 1 BY 1 UNTIL A > 13.              ANAL-TWO
030400      WRITE PRINT-LINE FROM DEPN-PROB-LINE BEFORE 2.                  ANAL-TWO
030450 OUTPT-TWO-DUMP-B.                                                    ANAL-TWO
030500      PERFORM DUMP-A VARYING A FROM 14 BY 1 UNTIL A > 26.             ANAL-TWO
030550      WRITE PRINT-LINE FROM DEPN-FREQ-LINE BEFORE 1.                  ANAL-TWO
030600      PERFORM DUMP-B VARYING A FROM 14 BY 1 UNTIL A > 26.             ANAL-TWO
030650      WRITE PRINT-LINE FROM DEPN-PROB-LINE BEFORE 2.                  ANAL-TWO
030700 OUTPT-TWO-DUMP-C.                                                    ANAL-TWO
030750      PERFORM DUMP-A VARYING A FROM 27 BY 1 UNTIL A > 34.             ANAL-TWO
030800      WRITE PRINT-LINE FROM DEPN-FREQ-LINE BEFORE 1.                  ANAL-TWO
030850      PERFORM DUMP-B VARYING A FROM 27 BY 1 UNTIL A > 34.             ANAL-TWO
030900      WRITE PRINT-LINE FROM DEPN-PROB-LINE BEFORE 2.                  ANAL-TWO
030950 COL-TITLES-B.                                                        ANAL-TWO
031000      COMPUTE L = A - 13.                                             ANAL-TWO
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031050      MOVE LTR (A) TO FIRST-LTR (L).                                  ANAL-TWO
031100 COL-TITLES-C.                                                        ANAL-TWO
031150      COMPUTE L = A - 26.                                             ANAL-TWO
031200      MOVE LTR (A) TO FIRST-LTR (L).                                  ANAL-TWO
031250 OUTPT-THREE-PREP.                                                    ANAL-TWO
031300      MOVE SPACES TO PRINT-LINE.                                      ANAL-TWO
031350      WRITE PRINT-LINE FROM OUTPT-THREE-A AFTER TOP-OF-PAGE.          ANAL-TWO
031400      WRITE PRINT-LINE FROM OUTPT-TWO-THREE-B BEFORE 1.               ANAL-TWO
031450      WRITE PRINT-LINE FROM LANG-LINE BEFORE 0.                       ANAL-TWO
031500      WRITE PRINT-LINE FROM LANG-UNDERLINE BEFORE 2.                  ANAL-TWO
031550      WRITE PRINT-LINE FROM FIRST-LTR-OUTPT BEFORE 2.                 ANAL-TWO
031600 VC-DUMP.                                                             ANAL-TWO
031650      COMPUTE VC-TOTAL = F-CONS-CONS + F-VOW-CONS + F-VOW-VOW         ANAL-TWO
031700          + F-CONS-VOW.                                               ANAL-TWO
031750      IF F-VOW-VOW > 0 COMPUTE P-VOW-VOW ROUNDED = F-VOW-VOW /        ANAL-TWO
031800          VC-TOTAL ELSE MOVE ZEROS TO P-VOW-VOW.                      ANAL-TWO
031850      IF F-CONS-VOW > 0 COMPUTE P-CONS-VOW ROUNDED = F-CONS-VOW /     ANAL-TWO
031900          VC-TOTAL ELSE MOVE ZEROS TO P-CONS-VOW.                     ANAL-TWO
031950      IF F-VOW-CONS > 0 COMPUTE P-VOW-CONS ROUNDED = F-VOW-CONS /     ANAL-TWO
032000          VC-TOTAL ELSE MOVE ZEROS TO P-VOW-CONS.                     ANAL-TWO
032050      IF F-CONS-CONS > 0 COMPUTE P-CONS-CONS ROUNDED =                ANAL-TWO
032100          F-CONS-CONS / VC-TOTAL ELSE MOVE ZEROS TO P-CONS-CONS.      ANAL-TWO
032150      WRITE PRINT-LINE FROM LANG-LINE AFTER TOP-OF-PAGE.              ANAL-TWO
032200      WRITE PRINT-LINE FROM LANG-UNDERLINE BEFORE 3.                  ANAL-TWO
032250      WRITE PRINT-LINE FROM OUTPT-FOUR-A BEFORE 2.                    ANAL-TWO
032300      WRITE PRINT-LINE FROM OUTPT-FOUR-B BEFORE 2.                    ANAL-TWO
032350      WRITE PRINT-LINE FROM OUTPT-FOUR-C BEFORE 2.                    ANAL-TWO
032400      WRITE PRINT-LINE FROM OUTPT-FOUR-D BEFORE 3.                    ANAL-TWO
032450 YULE-PREP.                                                           ANAL-TWO
032500      COMPUTE S = S + (ILF (A) ** 2).                                 ANAL-TWO
032550 KS-CALC.                                                             ANAL-TWO
032600      COMPUTE CRF-TOTAL = CRF-TOTAL + ILP (A).                        ANAL-TWO
032650      MOVE LTR (A) TO KS-LTR.                                         ANAL-TWO
032700      MOVE CRF-TOTAL TO KS-CRF.                                       ANAL-TWO
032750      WRITE PRINT-LINE FROM KS-LINE BEFORE 1.                         ANAL-TWO
032800 DUMP-A.                                                              ANAL-TWO
032850      IF B > 34 COMPUTE L = B - 34, MOVE LTR (L) TO FREQ-ROW-LTR,     ANAL-TWO
032900          ELSE MOVE LTR (B) TO FREQ-ROW-LTR.                          ANAL-TWO
032950      IF A < 14 MOVE FOL-FREQ (A, B) TO DEPN-FREQ (A).                ANAL-TWO
033000      IF A > 13 AND A < 27 COMPUTE M = A - 13, MOVE FOL-FREQ (A, B)ANAL-TWO
033050          TO DEPN-FREQ (M).                                           ANAL-TWO
033100      IF A > 26 COMPUTE M = A - 26, MOVE FOL-FREQ (A, B)              ANAL-TWO
033150          TO DEPN-FREQ (M).                                           ANAL-TWO
033200 DUMP-B.                                                              ANAL-TWO
033250      IF B > 34 COMPUTE L = B - 34, MOVE LTR (L) TO PROB-ROW-LTR,     ANAL-TWO
033300          ELSE MOVE LTR (B) TO PROB-ROW-LTR.                          ANAL-TWO
033350      IF A < 14 MOVE FOL-PROB (A, B) TO DEPN-PROB (A).                ANAL-TWO
033400      IF A > 13 AND A < 27 COMPUTE M = A - 13, MOVE FOL-PROB (A, B)ANAL-TWO
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033450          TO DEPN-PROB (M).                                       ANAL-TWO
033500      IF A > 26 COMPUTE M = A - 26, MOVE FOL-PROB (A, B)          ANAL-TWO
033550          TO DEPN-PROB (M).                                       ANAL-TWO
033600 ZEROING-ONE.                                                     ANAL-TWO
033650      MOVE ZEROS TO ILF (A).                                      ANAL-TWO
033700      MOVE ZEROS TO ILP (A).                                      ANAL-TWO
033750 FLUSHING.                                                        ANAL-TWO
033800      MOVE SPACES TO FIRST-LTR (A).                               ANAL-TWO
033850      MOVE ZEROS TO DEPN-FREQ (A), DEPN-PROB (A).                 ANAL-TWO
033900 ZEROING-TWO.                                                     ANAL-TWO
033950      MOVE ZEROS TO FOL-FREQ (A, B).                              ANAL-TWO
034000      MOVE ZEROS TO FOL-PROB (A, B).                              ANAL-TWO
034050 OUTPT-FIVE-PREP.                                                 ANAL-TWO
034100      WRITE PRINT-LINE FROM OUTPT-FIVE-A AFTER TOP-OF-PAGE.       ANAL-TWO
034150      WRITE PRINT-LINE FROM OUTPT-TWO-THREE-B BEFORE 1.           ANAL-TWO
034200      WRITE PRINT-LINE FROM LANG-LINE BEFORE 0.                   ANAL-TWO
034250      WRITE PRINT-LINE FROM LANG-UNDERLINE BEFORE 2.              ANAL-TWO
034300      WRITE PRINT-LINE FROM FIRST-LTR-OUTPT BEFORE 2.             ANAL-TWO
034350 OUTPT-DUMP-D.                                                    ANAL-TWO
034400      PERFORM DUMP-B VARYING A FROM 1 BY 1 UNTIL A > 13.          ANAL-TWO
034450      WRITE PRINT-LINE FROM DEPN-PROB-LINE BEFORE 2.              ANAL-TWO
034500 OUTPT-DUMP-E.                                                    ANAL-TWO
034550      PERFORM DUMP-B VARYING A FROM 14 BY 1 UNTIL A > 26.         ANAL-TWO
034600      WRITE PRINT-LINE FROM DEPN-PROB-LINE BEFORE 2.              ANAL-TWO
034650 OUTPT-DUMP-F.                                                    ANAL-TWO
034700      PERFORM DUMP-B VARYING A FROM 27 BY 1 UNTIL A > 34.         ANAL-TWO
034750      WRITE PRINT-LINE FROM DEPN-PROB-LINE BEFORE 2.              ANAL-TWO
034800 OUTPT-SIX-PREP.                                                  ANAL-TWO
034850      WRITE PRINT-LINE FROM OUTPT-SIX-A AFTER TOP-OF-PAGE.        ANAL-TWO
034900      WRITE PRINT-LINE FROM OUTPT-TWO-THREE-B BEFORE 1.           ANAL-TWO
034950      WRITE PRINT-LINE FROM LANG-LINE BEFORE 0.                   ANAL-TWO
035000      WRITE PRINT-LINE FROM LANG-UNDERLINE BEFORE 2.              ANAL-TWO
035050      WRITE PRINT-LINE FROM FIRST-LTR-OUTPT BEFORE 2.             ANAL-TWO
035100 YULES-K-PREP.                                                    ANAL-TWO
035150      COMPUTE S = S + (FOL-FREQ (A, B) ** 2).                     ANAL-TWO
035200 CARD-DUMP.                                                       ANAL-TWO
035250      COMPUTE CRF-TOTAL = CRF-TOTAL + FOL-PROB (A, B).            ANAL-TWO
035300      ADD 1 TO L.                                                 ANAL-TWO
035350      MOVE CRF-TOTAL TO CRF-OUT (L).                              ANAL-TWO
035400      IF WS-SEQ-NR = 105, ADD 1 TO WS-SEQ-NR                      ANAL-TWO
035450                          MOVE WS-SEQ-NR TO L-SEQ-NR              ANAL-TWO
035500                          MOVE CRF-TOTAL TO L-CRF-OUT             ANAL-TWO
035550                          WRITE CARD-OUT FROM LAST-CARD-FILL.     ANAL-TWO
035600      IF L = 11 ADD 1 TO WS-SEQ-NR                                ANAL-TWO
035650                MOVE WS-SEQ-NR TO SEQ-NR                          ANAL-TWO
035700                MOVE ZEROS TO L                                   ANAL-TWO
035750                WRITE CARD-OUT FROM CARD-FILL.                    ANAL-TWO
035800 E-1.                                                             ANAL-TWO
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035850      MOVE 016450 TO ER-STEP.                                    ANAL-TWO
035900      GO TO DUMP.                                                ANAL-TWO
035950 E-2.                                                            ANAL-TWO
036000      MOVE 016850 TO ER-STEP.                                    ANAL-TWO
036050      GO TO DUMP.                                                ANAL-TWO
036100 E-3.                                                            ANAL-TWO
036150      MOVE 017300 TO ER-STEP.                                    ANAL-TWO
036200      GO TO DUMP.                                                ANAL-TWO
036250 E-4.                                                            ANAL-TWO
036300      MOVE 017550 TO ER-STEP.                                    ANAL-TWO
036350      GO TO DUMP.                                                ANAL-TWO
036400 E-5.                                                            ANAL-TWO
036450      MOVE 018200 TO ER-STEP.                                    ANAL-TWO
036500      GO TO DUMP.                                                ANAL-TWO
036550 E-6.                                                            ANAL-TWO
036600      MOVE 018850 TO ER-STEP.                                    ANAL-TWO
036650      GO TO DUMP.                                                ANAL-TWO
036700 E-7.                                                            ANAL-TWO
036750      MOVE 019800 TO ER-STEP.                                    ANAL-TWO
036800      GO TO DUMP.                                                ANAL-TWO
036850 E-8.                                                            ANAL-TWO
036900      MOVE 022450 TO ER-STEP.                                    ANAL-TWO
036950      GO TO DUMP.                                                ANAL-TWO
037000 E-9.                                                            ANAL-TWO
037050      MOVE 022500 TO ER-STEP.                                    ANAL-TWO
037100      GO TO DUMP.                                                ANAL-TWO
037150 E-10.                                                           ANAL-TWO
037200      MOVE 022600 TO ER-STEP.                                    ANAL-TWO
037250      GO TO DUMP.                                                ANAL-TWO
037300 E-11.                                                           ANAL-TWO
037350      MOVE 022700 TO ER-STEP.                                    ANAL-TWO
037400      GO TO DUMP.                                                ANAL-TWO
037450 DUMP.                                                           ANAL-TWO
037500      MOVE CARD-NR TO ER-CARD.                                   ANAL-TWO
037550      WRITE PRINT-LINE FROM ERROR-LINE AFTER 2.                  ANAL-TWO
037600      GO TO EOJ.                                                 ANAL-TWO
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APPENDIX I. LANGUAGE IDENTIFICATION PROGRAM (V-1)

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000050 IDENTIFICATION DIVISION.                                        IDEN-ONE
000100 PROGRAM-ID.  LANGUAGE-ID-VERSION-ONE.                           IDEN-ONE
000150 AUTHOR.  LCDR. MORTON D. RAU, USN.                              IDEN-ONE
000200 REMARKS.  THIS PROGRAM IS PART OF MY MASTER OF SCIENCE IN       IDEN-ONE
000250     MANAGEMENT THESIS AND IS DESIGNED TO IDENTIFY SHORT SAMPLE  IDEN-ONE
000300     TEXT OF A LANGUAGE AS EITHER ENGLISH OR SPANISH.  THE       IDEN-ONE
000350     DECISION IS BASED ON STATISTICAL CHARACTERISTICS OF LETTERS IDEN-ONE
000400     WITHIN INDEPENDENT WORDS WITH NO CONSIDERATION GIVEN TO     IDEN-ONE
000450     SPACES.                                                     IDEN-ONE
000500         INPUT DATA MUST APPEAR IN THE FOLLOWING ORDER:          IDEN-ONE
000550             3 ENGLISH A CARDS - ICRF TABLE VALUES               IDEN-ONE
000600             99 ENGLISH B CARDS - DCRF TABLE VALUES X(2)/X(1)    IDEN-ONE
000650             99 ENGLISH C CARDS - DCRF TABLE VALUES X(3)/X(1)    IDEN-ONE
000700             3 SPANISH A CARDS - ICRF TABLE VALUES               IDEN-ONE
000750             99 SPANISH B CARDS - DCRF TABLE VALUES X(2)/X(1)    IDEN-ONE
000800             99 SPANISH C CARDS - DCRF TABLE VALUES X(3)/X(1)    IDEN-ONE
000850             1 HEAD CARD PRECEEDING EACH GROUP OF SAMPLE CARDS.  IDEN-ONE
000900         MAXIMUM NR OF SAMPLE CARDS PER TEST IS 999 OR 9,999     IDEN-ONE
000950     INDIVIDUAL CHARACTERS, NOT COUNTING SPACES.                 IDEN-ONE
001000 ENVIRONMENT DIVISION.                                            IDEN-ONE
001050 CONFIGURATION SECTION.                                           IDEN-ONE
001100 SOURCE-COMPUTER.  IBM-360-67.                                    IDEN-ONE
001150 OBJECT-COMPUTER.  IBM-360-67.                                    IDEN-ONE
001200 SPECIAL-NAMES.                                                  IDEN-ONE
001250     C01 IS PAGE-TOP.                                            IDEN-ONE
001300 INPUT-OUTPUT SECTION.                                            IDEN-ONE
001350 FILE-CONTROL.                                                   IDEN-ONE
001400     SELECT SAMPLE ASSIGN TO UR-S-IN1.                           IDEN-ONE
001450     SELECT RESULT ASSIGN TO UR-S-OUT1.                          IDEN-ONE
001500 DATA DIVISION.                                                  IDEN-ONE
001550 FILE SECTION.                                                   IDEN-ONE
001600 FD  SAMPLE                                                      IDEN-ONE
001650     LABEL RECORDS ARE OMITTED                                   IDEN-ONE
001700     BLOCK CONTAINS 5 RECORDS                                    IDEN-ONE
001750     DATA RECORD IS SAMPLE-CARD, HEAD-CARD, DATA-CARD.           IDEN-ONE
001800 01  SAMPLE-CARD.                                                IDEN-ONE
001850     05  FILLER                PIC XX.                           IDEN-ONE
001900     05  SAMPLE-FLD.                                             IDEN-ONE
001950         10  CB                PIC X, OCCURS 71 TIMES.           IDEN-ONE
002000     05  FILLER                PIC X(7).                         IDEN-ONE
002050 01  HEAD-CARD.                                                  IDEN-ONE
002100     05  CARD-TYPE             PIC A.                            IDEN-ONE
002150         88  NEXT-SAMPLE VALUE 'X'.                              IDEN-ONE
002200     05  FILLER                PIC X.                            IDEN-ONE
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002250      05  TEST-NAME              PIC X(20).                          IDEN-ONE
002300      05  FILLER                 PIC X(58).                          IDEN-ONE
002350 01   DATA-CARD.                                                      IDEN-ONE
002400      05  DC-ID                  PIC A.                              IDEN-ONE
002450      05  DC-SEQ                 PIC 999.                            IDEN-ONE
002500      05  DC-LANG                PIC X(10).                          IDEN-ONE
002550      05  CRF-IN                 PIC 9V9(5), OCCURS 11 TIMES.        IDEN-ONE
002600 FD   RESULT                                                         IDEN-ONE
002650      LABEL RECORDS ARE OMITTED                                      IDEN-ONE
002700      BLOCK CONTAINS 5 RECORDS                                       IDEN-ONE
002750      DATA RECORD IS PRINT-LINE.                                     IDEN-ONE
002800 01   PRINT-LINE                 PIC X(133).                         IDEN-ONE
002850 WORKING-STORAGE SECTION.                                             IDEN-ONE
002900 77   A                          PIC 99, COMP, SYNC.                 IDEN-ONE
002950 77   B                          PIC 99, COMP, SYNC.                 IDEN-ONE
003000 77   N                          PIC 99, COMP, SYNC.                 IDEN-ONE
003050 77   S                          PIC 9(12), COMP, SYNC.              IDEN-ONE
003100 77   L                          PIC 99, COMP, SYNC.                 IDEN-ONE
003150 77   M                          PIC 99, COMP, SYNC.                 IDEN-ONE
003200 77   X                          PIC 99, COMP, SYNC.                 IDEN-ONE
003250 77   Y                          PIC 99, COMP, SYNC.                 IDEN-ONE
003300 77   VC-TOTAL                  PIC 9(4).                           IDEN-ONE
003350 77   F-CONS-CONS               PIC 9(4), COMP, SYNC.               IDEN-ONE
003400 77   F-VOW-CONS                PIC 9(4), COMP, SYNC.               IDEN-ONE
003450 77   F-CONS-VOW                PIC 9(4), COMP, SYNC.               IDEN-ONE
003500 77   F-VOW-VOW                 PIC 9(4), COMP, SYNC.               IDEN-ONE
003550 77   FOL-FREQ-TOTAL            PIC 9(4), COMP, SYNC.               IDEN-ONE
003600 77   ILF-TOTAL                 PIC 9(4), COMP, SYNC.               IDEN-ONE
003650 77   CARD-NR                   PIC 9(3), COMP, SYNC.               IDEN-ONE
003700 77   K                          PIC 9(13)V999.                      IDEN-ONE
003750 77   Z-ENG                     PIC 9(5)V999 COMP, SYNC.            IDEN-ONE
003800 77   Z-SPAN                    PIC 9(5)V999 COMP, SYNC.            IDEN-ONE
003850 77   Z                          PIC 99V999 COMP, SYNC.              IDEN-ONE
003900 77   P                          PIC 999V9(12) COMP, SYNC.           IDEN-ONE
003950 77   J                          PIC S999V9(12) COMP, SYNC.          IDEN-ONE
004000 77   Z2                         PIC 999V9(6) COMP, SYNC.            IDEN-ONE
004050 77   CRF-TOTAL                 PIC 9V9(5), COMP-3.                 IDEN-ONE
004100 77   D                          PIC 9V9(5), COMP, SYNC.             IDEN-ONE
004150 77   ENG-D                     PIC 9V9(5), COMP, SYNC.             IDEN-ONE
004200 77   SPAN-D                    PIC 9V9(5), COMP, SYNC.             IDEN-ONE
004250 77   SAMPLE-SIZE               PIC 9(4), COMP, SYNC.               IDEN-ONE
004300 77   E                          PIC 99V99 COMP, SYNC.               IDEN-ONE
004350 77   T                          PIC 999, COMP, SYNC.                IDEN-ONE
004400 77   FFT2                       PIC 9(4).                           IDEN-ONE
004450 01   LTR-TABLE-VALUES.                                              IDEN-ONE
004500      05  FILLER                 PIC X VALUE 'A'.                    IDEN-ONE
004550      05  FILLER                 PIC X VALUE 'E'.                    IDEN-ONE
004600      05  FILLER                 PIC X VALUE 'I'.                    IDEN-ONE
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004650      05  FILLER                 PIC X VALUE '0'.                        IDEN-ONE
004700      05  FILLER                 PIC X VALUE 'U'.                        IDEN-ONE
004750      05  FILLER                 PIC X VALUE '1'.                        IDEN-ONE
004800      05  FILLER                 PIC X VALUE '2'.                        IDEN-ONE
004850      05  FILLER                 PIC X VALUE '3'.                        IDEN-ONE
004900      05  FILLER                 PIC X VALUE '4'.                        IDEN-ONE
004950      05  FILLER                 PIC X VALUE '5'.                        IDEN-ONE
005000      05  FILLER                 PIC X VALUE 'B'.                        IDEN-ONE
005050      05  FILLER                 PIC X VALUE 'C'.                        IDEN-ONE
005100      05  FILLER                 PIC X VALUE 'D'.                        IDEN-ONE
005150      05  FILLER                 PIC X VALUE 'F'.                        IDEN-ONE
005200      05  FILLER                 PIC X VALUE 'G'.                        IDEN-ONE
005250      05  FILLER                 PIC X VALUE 'H'.                        IDEN-ONE
005300      05  FILLER                 PIC X VALUE 'J'.                        IDEN-ONE
005350      05  FILLER                 PIC X VALUE 'K'.                        IDEN-ONE
005400      05  FILLER                 PIC X VALUE 'L'.                        IDEN-ONE
005450      05  FILLER                 PIC X VALUE 'M'.                        IDEN-ONE
005500      05  FILLER                 PIC X VALUE 'N'.                        IDEN-ONE
005550      05  FILLER                 PIC X VALUE 'P'.                        IDEN-ONE
005600      05  FILLER                 PIC X VALUE 'Q'.                        IDEN-ONE
005650      05  FILLER                 PIC X VALUE 'R'.                        IDEN-ONE
005700      05  FILLER                 PIC X VALUE 'S'.                        IDEN-ONE
005750      05  FILLER                 PIC X VALUE 'T'.                        IDEN-ONE
005800      05  FILLER                 PIC X VALUE 'V'.                        IDEN-ONE
005850      05  FILLER                 PIC X VALUE 'W'.                        IDEN-ONE
005900      05  FILLER                 PIC X VALUE 'X'.                        IDEN-ONE
005950      05  FILLER                 PIC X VALUE 'Y'.                        IDEN-ONE
006000      05  FILLER                 PIC X VALUE 'Z'.                        IDEN-ONE
006050      05  FILLER                 PIC X VALUE '6'.                        IDEN-ONE
006100      05  FILLER                 PIC X VALUE '7'.                        IDEN-ONE
006150 01   LTR-TABLE REDEFINES LTR-TABLE-VALUES.                             IDEN-ONE
006200      05  LTR                    PIC X OCCURS 33 TIMES.                  IDEN-ONE
006250 01   ENG-ICRF-TABLE.                                                   IDEN-ONE
006300      05  ENG-ICRF               PIC 9V9(5) OCCURS 33 TIMES.             IDEN-ONE
006350 01   SPAN-ICRF-TABLE.                                                  IDEN-ONE
006400      05  SPAN-ICRF              PIC 9V9(5) OCCURS 33 TIMES.             IDEN-ONE
006450 01   ENG-DCRF-TABLE.                                                   IDEN-ONE
006500      05  ENG-FST-LTR            OCCURS 33 TIMES.                        IDEN-ONE
006550          10  ENG-DCRF           PIC 9V9(5) COMP SYNC OCCURS 66 TIMES.IDEN-ONE
006600 01   SPAN-DCRF-TABLE.                                                  IDEN-ONE
006650      05  SPAN-FST-LTR           OCCURS 33 TIMES.                        IDEN-ONE
006700          10  SPAN-DCRF          PIC 9V9(5) COMP SYNC OCCURS 66 TIMES.IDEN-ONE
006750 01   ENG-VC-CRF-TABLE-VALUES.                                          IDEN-ONE
006800      05  FILLER                 PIC 9V9(5) VALUE 0.05118.               IDEN-ONE
006850      05  FILLER                 PIC 9V9(5) VALUE 0.40611.               IDEN-ONE
006900      05  FILLER                 PIC 9V9(5) VALUE 0.76278.               IDEN-ONE
006950      05  FILLER                 PIC 9V9(5) VALUE 1.00000.               IDEN-ONE
007000 01   ENG-VC-CRF-TABLE REDEFINES ENG-VC-CRF-TABLE-VALUES.                IDEN-ONE
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007050      05  ENG-VC-CRF            PIC 9V9(5) OCCURS 4 TIMES.          IDEN-ONE
007100 01   SPAN-VC-CRF-TABLE-VALUES.                                     IDEN-ONE
007150      05  FILLER                PIC 9V9(5) VALUE 0.06163.           IDEN-ONE
007200      05  FILLER                PIC 9V9(5) VALUE 0.43293.           IDEN-ONE
007250      05  FILLER                PIC 9V9(5) VALUE 0.87982.           IDEN-ONE
007300      05  FILLER                PIC 9V9(5) VALUE 1.00000.           IDEN-ONE
007350 01   SPAN-VC-CRF-TABLE REDEFINES SPAN-VC-CRF-TABLE-VALUES.         IDEN-ONE
007400      05  SPAN-VC-CRF           PIC 9V9(5) OCCURS 4 TIMES.          IDEN-ONE
007450 01   IND-FREQ-TABLE.                                               IDEN-ONE
007500      05  ILF                   PIC 9(4) COMP SYNC OCCURS 33 TIMES. IDEN-ONE
007550 01   DEPENDENCY-FREQ-TABLE.                                        IDEN-ONE
007600      05  FST-LTR               OCCURS 33 TIMES.                    IDEN-ONE
007650          10  FOL-FREQ          PIC 9(4) COMP SYNC OCCURS 66 TIMES. IDEN-ONE
007700 01   DEPENDENCY-PROB-TABLE.                                        IDEN-ONE
007750      05  GIVEN-LTR             OCCURS 33 TIMES.                    IDEN-ONE
007800          10  FOL-PROB          PIC 9V9(5) COMP SYNC OCCURS 66 TIMES.IDEN-ONE
007850 01   KS-ALFA-TABLE-VALUES.                                         IDEN-ONE
007900      05  FILLER                PIC V9(6) VALUE .999999.            IDEN-ONE
007950      05  FILLER                PIC V9(6) VALUE .999996.            IDEN-ONE
008000      05  FILLER                PIC V9(6) VALUE .999991.            IDEN-ONE
008050      05  FILLER                PIC V9(6) VALUE .999979.            IDEN-ONE
008100      05  FILLER                PIC V9(6) VALUE .999954.            IDEN-ONE
008150      05  FILLER                PIC V9(6) VALUE .999909.            IDEN-ONE
008200      05  FILLER                PIC V9(6) VALUE .999829.            IDEN-ONE
008250      05  FILLER                PIC V9(6) VALUE .999697.            IDEN-ONE
008300      05  FILLER                PIC V9(6) VALUE .999489.            IDEN-ONE
008350      05  FILLER                PIC V9(6) VALUE .999174.            IDEN-ONE
008400      05  FILLER                PIC V9(6) VALUE .998715.            IDEN-ONE
008450      05  FILLER                PIC V9(6) VALUE .998071.            IDEN-ONE
008500      05  FILLER                PIC V9(6) VALUE .997192.            IDEN-ONE
008550      05  FILLER                PIC V9(6) VALUE .996028.            IDEN-ONE
008600      05  FILLER                PIC V9(6) VALUE .994524.            IDEN-ONE
008650      05  FILLER                PIC V9(6) VALUE .992623.            IDEN-ONE
008700      05  FILLER                PIC V9(6) VALUE .990270.            IDEN-ONE
008750      05  FILLER                PIC V9(6) VALUE .987410.            IDEN-ONE
008800      05  FILLER                PIC V9(6) VALUE .983995.            IDEN-ONE
008850      05  FILLER                PIC V9(6) VALUE .979978.            IDEN-ONE
008900      05  FILLER                PIC V9(6) VALUE .975318.            IDEN-ONE
008950      05  FILLER                PIC V9(6) VALUE .969983.            IDEN-ONE
009000      05  FILLER                PIC V9(6) VALUE .963945.            IDEN-ONE
009050      05  FILLER                PIC V9(6) VALUE .957186.            IDEN-ONE
009100      05  FILLER                PIC V9(6) VALUE .949694.            IDEN-ONE
009150      05  FILLER                PIC V9(6) VALUE .941466.            IDEN-ONE
009200      05  FILLER                PIC V9(6) VALUE .932503.            IDEN-ONE
009250      05  FILLER                PIC V9(6) VALUE .922817.            IDEN-ONE
009300      05  FILLER                PIC V9(6) VALUE .912423.            IDEN-ONE
009350      05  FILLER                PIC V9(6) VALUE .901344.            IDEN-ONE
009400      05  FILLER                PIC V9(6) VALUE .889605.            IDEN-ONE
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009450     05   FILLER                PIC V9(6) VALUE .877240.                IDEN-ONE
009500     05   FILLER                PIC V9(6) VALUE .864282.                IDEN-ONE
009550     05   FILLER                PIC V9(6) VALUE .850771.                IDEN-ONE
009600     05   FILLER                PIC V9(6) VALUE .836775.                IDEN-ONE
009650     05   FILLER                PIC V9(6) VALUE .822247.                IDEN-ONE
009700     05   FILLER                PIC V9(6) VALUE .807333.                IDEN-ONE
009750     05   FILLER                PIC V9(6) VALUE .792013.                IDEN-ONE
009800     05   FILLER                PIC V9(6) VALUE .776363.                IDEN-ONE
009850     05   FILLER                PIC V9(6) VALUE .760418.                IDEN-ONE
009900     05   FILLER                PIC V9(6) VALUE .744220.                IDEN-ONE
009950     05   FILLER                PIC V9(6) VALUE .727811.                IDEN-ONE
010000     05   FILLER                PIC V9(6) VALUE .711235.                IDEN-ONE
010050     05   FILLER                PIC V9(6) VALUE .694529.                IDEN-ONE
010100     05   FILLER                PIC V9(6) VALUE .677735.                IDEN-ONE
010150     05   FILLER                PIC V9(6) VALUE .660887.                IDEN-ONE
010200     05   FILLER                PIC V9(6) VALUE .644019.                IDEN-ONE
010250     05   FILLER                PIC V9(6) VALUE .627167.                IDEN-ONE
010300     05   FILLER                PIC V9(6) VALUE .610360.                IDEN-ONE
010350     05   FILLER                PIC V9(6) VALUE .593628.                IDEN-ONE
010400     05   FILLER                PIC V9(6) VALUE .576998.                IDEN-ONE
010450     05   FILLER                PIC V9(6) VALUE .560495.                IDEN-ONE
010500     05   FILLER                PIC V9(6) VALUE .544143.                IDEN-ONE
010550     05   FILLER                PIC V9(6) VALUE .527959.                IDEN-ONE
010600     05   FILLER                PIC V9(6) VALUE .511970.                IDEN-ONE
010650     05   FILLER                PIC V9(6) VALUE .496192.                IDEN-ONE
010700     05   FILLER                PIC V9(6) VALUE .480634.                IDEN-ONE
010750     05   FILLER                PIC V9(6) VALUE .465318.                IDEN-ONE
010800     05   FILLER                PIC V9(6) VALUE .450256.                IDEN-ONE
010850     05   FILLER                PIC V9(6) VALUE .435454.                IDEN-ONE
010900     05   FILLER                PIC V9(6) VALUE .420930.                IDEN-ONE
010950     05   FILLER                PIC V9(6) VALUE .406684.                IDEN-ONE
011000     05   FILLER                PIC V9(6) VALUE .392730.                IDEN-ONE
011050     05   FILLER                PIC V9(6) VALUE .379072.                IDEN-ONE
011100     05   FILLER                PIC V9(6) VALUE .365714.                IDEN-ONE
011150     05   FILLER                PIC V9(6) VALUE .352662.                IDEN-ONE
011200     05   FILLER                PIC V9(6) VALUE .339918.                IDEN-ONE
011250     05   FILLER                PIC V9(6) VALUE .327484.                IDEN-ONE
011300     05   FILLER                PIC V9(6) VALUE .315364.                IDEN-ONE
011350     05   FILLER                PIC V9(6) VALUE .303556.                IDEN-ONE
011400     05   FILLER                PIC V9(6) VALUE .292060.                IDEN-ONE
011450     05   FILLER                PIC V9(6) VALUE .280874.                IDEN-ONE
011500     05   FILLER                PIC V9(6) VALUE .270000.                IDEN-ONE
011550     05   FILLER                PIC V9(6) VALUE .259434.                IDEN-ONE
011600     05   FILLER                PIC V9(6) VALUE .249174.                IDEN-ONE
011650     05   FILLER                PIC V9(6) VALUE .239220.                IDEN-ONE
011700     05   FILLER                PIC V9(6) VALUE .229566.                IDEN-ONE
011750     05   FILLER                PIC V9(6) VALUE .220206.                IDEN-ONE
011800     05   FILLER                PIC V9(6) VALUE .211140.                IDEN-ONE
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011850     05  FILLER                PIC V9(6) VALUE .202364.          IDEN-ONE
011900     05  FILLER                PIC V9(6) VALUE .193872.          IDEN-ONE
011950     05  FILLER                PIC V9(6) VALUE .185658.          IDEN-ONE
012000     05  FILLER                PIC V9(6) VALUE .177718.          IDEN-ONE
012050     05  FILLER                PIC V9(6) VALUE .170050.          IDEN-ONE
012100     05  FILLER                PIC V9(6) VALUE .162644.          IDEN-ONE
012150     05  FILLER                PIC V9(6) VALUE .155498.          IDEN-ONE
012200     05  FILLER                PIC V9(6) VALUE .148606.          IDEN-ONE
012250     05  FILLER                PIC V9(6) VALUE .141962.          IDEN-ONE
012300     05  FILLER                PIC V9(6) VALUE .135558.          IDEN-ONE
012350     05  FILLER                PIC V9(6) VALUE .129388.          IDEN-ONE
012400     05  FILLER                PIC V9(6) VALUE .123452.          IDEN-ONE
012450     05  FILLER                PIC V9(6) VALUE .117742.          IDEN-ONE
012500     05  FILLER                PIC V9(6) VALUE .112250.          IDEN-ONE
012550     05  FILLER                PIC V9(6) VALUE .106970.          IDEN-ONE
012600     05  FILLER                PIC V9(6) VALUE .101896.          IDEN-ONE
012650     05  FILLER                PIC V9(6) VALUE .097028.          IDEN-ONE
012700     05  FILLER                PIC V9(6) VALUE .092352.          IDEN-ONE
012750     05  FILLER                PIC V9(6) VALUE .087863.          IDEN-ONE
012800     05  FILLER                PIC V9(6) VALUE .083568.          IDEN-ONE
012850     05  FILLER                PIC V9(6) VALUE .079444.          IDEN-ONE
012900     05  FILLER                PIC V9(6) VALUE .075495.          IDEN-ONE
012950     05  FILLER                PIC V9(6) VALUE .071712.          IDEN-ONE
013000     05  FILLER                PIC V9(6) VALUE .068092.          IDEN-ONE
013050     05  FILLER                PIC V9(6) VALUE .064630.          IDEN-ONE
013100     05  FILLER                PIC V9(6) VALUE .061318.          IDEN-ONE
013150     05  FILLER                PIC V9(6) VALUE .058152.          IDEN-ONE
013200     05  FILLER                PIC V9(6) VALUE .055128.          IDEN-ONE
013250     05  FILLER                PIC V9(6) VALUE .052244.          IDEN-ONE
013300     05  FILLER                PIC V9(6) VALUE .049488.          IDEN-ONE
013350     05  FILLER                PIC V9(6) VALUE .046858.          IDEN-ONE
013400     05  FILLER                PIC V9(6) VALUE .044350.          IDEN-ONE
013450     05  FILLER                PIC V9(6) VALUE .041960.          IDEN-ONE
013500     05  FILLER                PIC V9(6) VALUE .039682.          IDEN-ONE
013550     05  FILLER                PIC V9(6) VALUE .037514.          IDEN-ONE
013600     05  FILLER                PIC V9(6) VALUE .035448.          IDEN-ONE
013650     05  FILLER                PIC V9(6) VALUE .033484.          IDEN-ONE
013700     05  FILLER                PIC V9(6) VALUE .031618.          IDEN-ONE
013750     05  FILLER                PIC V9(6) VALUE .029842.          IDEN-ONE
013800     05  FILLER                PIC V9(6) VALUE .028154.          IDEN-ONE
013850     05  FILLER                PIC V9(6) VALUE .026552.          IDEN-ONE
013900     05  FILLER                PIC V9(6) VALUE .025030.          IDEN-ONE
013950     05  FILLER                PIC V9(6) VALUE .023558.          IDEN-ONE
014000     05  FILLER                PIC V9(6) VALUE .022218.          IDEN-ONE
014050     05  FILLER                PIC V9(6) VALUE .020920.          IDEN-ONE
014100     05  FILLER                PIC V9(6) VALUE .019690.          IDEN-ONE
014150     05  FILLER                PIC V9(6) VALUE .018524.          IDEN-ONE
014200     05  FILLER                PIC V9(6) VALUE .017422.          IDEN-ONE
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014250      05  FILLER                 PIC V9(6) VALUE .016378.                IDEN-ONE
014300      05  FILLER                 PIC V9(6) VALUE .015390.                IDEN-ONE
014350      05  FILLER                 PIC V9(6) VALUE .014456.                IDEN-ONE
014400      05  FILLER                 PIC V9(6) VALUE .013574.                IDEN-ONE
014450      05  FILLER                 PIC V9(6) VALUE .012740.                IDEN-ONE
014500      05  FILLER                 PIC V9(6) VALUE .011952.                IDEN-ONE
014550      05  FILLER                 PIC V9(6) VALUE .011209.                IDEN-ONE
014600      05  FILLER                 PIC V9(6) VALUE .010508.                IDEN-ONE
014650      05  FILLER                 PIC V9(6) VALUE .009846.                IDEN-ONE
014700      05  FILLER                 PIC V9(6) VALUE .009223.                IDEN-ONE
014750      05  FILLER                 PIC V9(6) VALUE .008636.                IDEN-ONE
014800      05  FILLER                 PIC V9(6) VALUE .008083.                IDEN-ONE
014850      05  FILLER                 PIC V9(6) VALUE .007562.                IDEN-ONE
014900      05  FILLER                 PIC V9(6) VALUE .007072.                IDEN-ONE
014950      05  FILLER                 PIC V9(6) VALUE .006611.                IDEN-ONE
015000      05  FILLER                 PIC V9(6) VALUE .006177.                IDEN-ONE
015050      05  FILLER                 PIC V9(6) VALUE .005770.                IDEN-ONE
015100      05  FILLER                 PIC V9(6) VALUE .005388.                IDEN-ONE
015150      05  FILLER                 PIC V9(6) VALUE .005028.                IDEN-ONE
015200      05  FILLER                 PIC V9(6) VALUE .004691.                IDEN-ONE
015250      05  FILLER                 PIC V9(6) VALUE .004375.                IDEN-ONE
015300      05  FILLER                 PIC V9(6) VALUE .004078.                IDEN-ONE
015350      05  FILLER                 PIC V9(6) VALUE .003800.                IDEN-ONE
015400      05  FILLER                 PIC V9(6) VALUE .003540.                IDEN-ONE
015450      05  FILLER                 PIC V9(6) VALUE .003296.                IDEN-ONE
015500      05  FILLER                 PIC V9(6) VALUE .003068.                IDEN-ONE
015550      05  FILLER                 PIC V9(6) VALUE .002845.                IDEN-ONE
015600      05  FILLER                 PIC V9(6) VALUE .002645.                IDEN-ONE
015650 01   KS-ALFA-TABLE REDEFINES KS-ALFA-TABLE-VALUES.                      IDEN-ONE
015700      05  KS-ALFA                PIC V9(6) OCCURS 155 TIMES.             IDEN-ONE
015750 01   TITLE.                                                             IDEN-ONE
015800      05  FILLER                 PIC X(38) VALUE SPACES.                 IDEN-ONE
015850      05  FILLER                 PIC X(38) VALUE 'IDEN-ONE, ACTUAL SAMIDEN-ONE
015900-     'PLE LANGUAGE IS:'.                                                 IDEN-ONE
015950      05  ANS                    PIC X(20).                              IDEN-ONE
016000      05  FILLER                 PIC X(37) VALUE SPACES.                 IDEN-ONE
016050 01   COL-HEAD.                                                          IDEN-ONE
016100      05  FILLER                 PIC X(74) VALUE SPACES.                 IDEN-ONE
016150      05  FILLER                 PIC X(15) VALUE 'LANGUAGE'.             IDEN-ONE
016200      05  FILLER                 PIC X(44) VALUE 'SIGNIFICANCE LEVEL'.IDEN-ONE
016250 01   TITLE-UL.                                                          IDEN-ONE
016300      05  FILLER                 PIC X(76) VALUE SPACES.                 IDEN-ONE
016350      05  FILLER                 PIC X(20) VALUE ALL '_'.                IDEN-ONE
016400      05  FILLER                 PIC X(37) VALUE SPACES.                 IDEN-ONE
016450 01   COL-HEAD-UL.                                                       IDEN-ONE
016500      05  FILLER                 PIC X(74) VALUE SPACES.                 IDEN-ONE
016550      05  FILLER                 PIC X(8) VALUE ALL '_'.                 IDEN-ONE
016600      05  FILLER                 PIC X(7) VALUE SPACES.                  IDEN-ONE
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016650      05  FILLER                 PIC X(18) VALUE ALL '_'.                IDEN-ONE
016700      05  FILLER                 PIC X(26) VALUE SPACES.                 IDEN-ONE
016750 01   O-LINE-ONE.                                                        IDEN-ONE
016800      05  FILLER                 PIC X(24) VALUE SPACES.                 IDEN-ONE
016850      05  FILLER                 PIC X(18) VALUE 'IDENTIFIED BY YULE'.IDEN-ONE
016900      05  FILLER                 PIC X     VALUE QUOTE.                  IDEN-ONE
016950      05  FILLER                 PIC X(30) VALUE 'S K FOR SINGLE LETTEIDEN-ONE
017000-     'RS AS:'.                                                          IDEN-ONE
017050      05  BANK-ONE               PIC X(30).                              IDEN-ONE
017100      05  FILLER                 PIC X(30) VALUE SPACES.                 IDEN-ONE
017150 01   O-LINE-TWO.                                                        IDEN-ONE
017200      05  FILLER                 PIC X(24) VALUE SPACES.                 IDEN-ONE
017250      05  FILLER                 PIC X(18) VALUE 'IDENTIFIED BY YULE'.IDEN-ONE
017300      05  FILLER                 PIC X     VALUE QUOTE.                  IDEN-ONE
017350      05  FILLER                 PIC X(30) VALUE 'S K FOR X(2)/X(1) ASIDEN-ONE
017400-     ':'.                                                               IDEN-ONE
017450      05  BANK-TWO               PIC X(30).                              IDEN-ONE
017500      05  FILLER                 PIC X(30) VALUE SPACES.                 IDEN-ONE
017550 01   O-LINE-THREE.                                                      IDEN-ONE
017600      05  FILLER                 PIC X(24) VALUE SPACES.                 IDEN-ONE
017650      05  FILLER                 PIC X(18) VALUE 'IDENTIFIED BY YULE'.IDEN-ONE
017700      05  FILLER                 PIC X     VALUE QUOTE.                  IDEN-ONE
017750      05  FILLER                 PIC X(30) VALUE 'S K FOR X(3)/X(1) ASIDEN-ONE
017800-     ':'.                                                               IDEN-ONE
017850      05  BANK-THREE             PIC X(30).                              IDEN-ONE
017900      05  FILLER                 PIC X(30) VALUE SPACES.                 IDEN-ONE
017950 01   O-LINE-FOUR.                                                       IDEN-ONE
018000      05  FILLER                 PIC X(24) VALUE SPACES.                 IDEN-ONE
018050      05  FILLER                 PIC X(49) VALUE 'IDENTIFIED BY K-S TEIDEN-ONE
018100-     'ST FOR VOW-CONS ORDER AS:'.                                       IDEN-ONE
018150      05  BANK-FOUR              PIC X(30).                              IDEN-ONE
018200      05  FILLER                 PIC X(30) VALUE SPACES.                 IDEN-ONE
018250 01   O-LINE-FIVE.                                                       IDEN-ONE
018300      05  FILLER                 PIC X(24) VALUE SPACES.                 IDEN-ONE
018350      05  FILLER                 PIC X(49) VALUE 'IDENTIFIED BY K-S TEIDEN-ONE
018400-     'ST FOR SINGLE LETTERS AS:'.                                       IDEN-ONE
018450      05  BANK-FIVE              PIC X(30).                              IDEN-ONE
018500      05  FILLER                 PIC X(30) VALUE SPACES.                 IDEN-ONE
018550 01   O-LINE-SIX.                                                        IDEN-ONE
018600      05  FILLER                 PIC X(24) VALUE SPACES.                 IDEN-ONE
018650      05  FILLER                 PIC X(49) VALUE 'IDENTIFIED BY K-S TEIDEN-ONE
018700-     'ST FOR X(2)/X(1) AS:'.                                            IDEN-ONE
018750      05  BANK-SIX               PIC X(30).                              IDEN-ONE
018800      05  FILLER                 PIC X(30) VALUE SPACES.                 IDEN-ONE
018850 01   O-LINE-SEVEN.                                                      IDEN-ONE
018900      05  FILLER                 PIC X(24) VALUE SPACES.                 IDEN-ONE
018950      05  FILLER                 PIC X(49) VALUE 'IDENTIFIED BY K-S TEIDEN-ONE
019000-     'ST FOR X(3)/X(1) AS:'.                                            IDEN-ONE
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019050        05  BANK-SEVEN          PIC X(30).                          IDEN-ONE
019100        05  FILLER              PIC X(30) VALUE SPACES.             IDEN-ONE
019150 01  BANK-FORM.                                                      IDEN-ONE
019200        05  BANK-LANG           PIC X(10).                          IDEN-ONE
019250        05  FILLER              PIC X(10) VALUE SPACES.             IDEN-ONE
019300        05  BANK-EQUAL          PIC X.                              IDEN-ONE
019350        05  BANK-ALFA           PIC B9.9(6).                        IDEN-ONE
019400 01  ERROR-LINE.                                                     IDEN-ONE
019450        05  FILLER              PIC X(21) VALUE ALL '*'.            IDEN-ONE
019500        05  FILLER              PIC X(20) VALUE 'OVERFLOW ERROR ON:'.IDEN-ONE
019550        05  ERROR-ANS           PIC X(20).                          IDEN-ONE
019600        05  FILLER              PIC X(72) VALUE ALL '*'.            IDEN-ONE
019650 01  DATA-FORM.                                                      IDEN-ONE
019700        05  CC                  PIC X, OCCURS 73 TIMES.             IDEN-ONE
019750 01  IND-PROB-TABLE.                                                 IDEN-ONE
019800        05  ILP                 PIC 9V9(5) COMP SYNC OCCURS 33 TIMES.IDEN-ONE
019850 01  VC-CRF-TABLE.                                                   IDEN-ONE
019900        05  VC-CRF              PIC 9V9(5) COMP SYNC OCCURS 4 TIMES. IDEN-ONE
019950 01  O-LINE-EIGHT.                                                   IDEN-ONE
020000        05  FILLER              PIC X.                              IDEN-ONE
020050        05  FILLER              PIC X(14) VALUE 'SAMPLE SIZE = '.   IDEN-ONE
020100        05  BANK-EIGHT          PIC ZZZ9.                           IDEN-ONE
020150        05  FILLER              PIC X(29) VALUE ' SINGLE LETTERS CONTIDEN-ONE
020200-       'AINED ON '.                                                 IDEN-ONE
020250        05  O-CARD-NR           PIC ZZ9.                            IDEN-ONE
020300        05  FILLER              PIC X(82) VALUE ' CARDS.'.          IDEN-ONE
020350 PROCEDURE DIVISION.                                                IDEN-ONE
020400 START-UP.                                                          IDEN-ONE
020450        OPEN INPUT SAMPLE, OUTPUT RESULT.                           IDEN-ONE
020500        MOVE 1 TO A.                                                IDEN-ONE
020550        MOVE 0 TO L, CARD-NR.                                       IDEN-ONE
020600        PERFORM ENG-FILL-1 33 TIMES.                                IDEN-ONE
020650        MOVE 1 TO A, B.                                             IDEN-ONE
020700        MOVE 0 TO L, CARD-NR.                                       IDEN-ONE
020750        PERFORM ENG-FILL-2 1089 TIMES.                              IDEN-ONE
020800        MOVE 1 TO A.                                                IDEN-ONE
020850        MOVE 34 TO B.                                               IDEN-ONE
020900        MOVE 0 TO L, CARD-NR.                                       IDEN-ONE
020950        PERFORM ENG-FILL-3 1089 TIMES.                              IDEN-ONE
021000        MOVE 1 TO A.                                                IDEN-ONE
021050        MOVE 0 TO L, CARD-NR.                                       IDEN-ONE
021100        PERFORM SPAN-FILL-1 33 TIMES.                               IDEN-ONE
021150        MOVE 1 TO A, B.                                             IDEN-ONE
021200        MOVE 0 TO L, CARD-NR.                                       IDEN-ONE
021250        PERFORM SPAN-FILL-2 1089 TIMES.                             IDEN-ONE
021300        MOVE 1 TO A.                                                IDEN-ONE
021350        MOVE 34 TO B.                                               IDEN-ONE
021400        MOVE 0 TO L, CARD-NR.                                       IDEN-ONE
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021450     PERFORM SPAN-FILL-3 1089 TIMES.                                IDEN-ONE
021500     MOVE ZEROS TO CARD-NR.                                         IDEN-ONE
021550 BEGIN.                                                             IDEN-ONE
021600     READ SAMPLE AT END GO TO EOJ.                                  IDEN-ONE
021650     IF NEXT-SAMPLE PERFORM CLOSE-OUT-RT THRU INITIALIZE-RT.        IDEN-ONE
021700     PERFORM DAT-SHIFT VARYING X FROM 1 BY 1 UNTIL X > 71.          IDEN-ONE
021750     ADD 1 TO CARD-NR ON SIZE ERROR GO TO ALERT.                    IDEN-ONE
021800     MOVE 3 TO N.                                                   IDEN-ONE
021850 DATA-COLL.                                                         IDEN-ONE
021900     IF CC (N) = SPACE GO TO BLANK-COL-STEP.                        IDEN-ONE
021950     MOVE 1 TO A.                                                   IDEN-ONE
022000 CK-ONE.                                                            IDEN-ONE
022050     IF CC (N) = LTR (A) GO TO PROC-TWO.                            IDEN-ONE
022100     IF A = 33 GO TO COL-STEP.                                      IDEN-ONE
022150     ADD 1 TO A.                                                    IDEN-ONE
022200     GO TO CK-ONE.                                                  IDEN-ONE
022250 PROC-TWO.                                                          IDEN-ONE
022300     ADD 1 TO ILF (A) ON SIZE ERROR GO TO ALERT.                    IDEN-ONE
022350     COMPUTE M = N + 1.                                             IDEN-ONE
022400     IF CC (M) = SPACE GO TO COL-STEP.                              IDEN-ONE
022450     IF CC (M) = '-' AND M = 73 PERFORM CARD-STEP-ONE.              IDEN-ONE
022500     MOVE 1 TO B.                                                   IDEN-ONE
022550 CK-TWO.                                                            IDEN-ONE
022600     IF CC (M) = LTR (B) GO TO PROC-THREE.                          IDEN-ONE
022650     IF B = 33 GO TO COL-STEP.                                      IDEN-ONE
022700     ADD 1 TO B.                                                    IDEN-ONE
022750     GO TO CK-TWO.                                                  IDEN-ONE
022800 PROC-THREE.                                                        IDEN-ONE
022850     ADD 1 TO FOL-FREQ (A, B) ON SIZE ERROR GO TO ALERT.            IDEN-ONE
022900     IF A < 11 AND B < 11 ADD 1 TO F-VOW-VOW ON SIZE                IDEN-ONE
022950         ERROR GO TO ALERT.                                         IDEN-ONE
023000     IF A < 11 AND B NOT < 11 ADD 1 TO F-CONS-VOW ON SIZE           IDEN-ONE
023050         ERROR GO TO ALERT.                                         IDEN-ONE
023100     IF A NOT < 11 AND B < 11 ADD 1 TO F-VOW-CONS ON SIZE           IDEN-ONE
023150     ERROR GO TO ALERT.                                             IDEN-ONE
023200     IF A NOT < 11 AND B NOT < 11 ADD 1 TO F-CONS-CONS ON SIZE      IDEN-ONE
023250         ERROR GO TO ALERT.                                         IDEN-ONE
023300     COMPUTE L = N + 2.                                             IDEN-ONE
023350     IF CC (L) = SPACE GO TO COL-STEP.                              IDEN-ONE
023400     IF CC (L) = '-' AND L = 73 PERFORM CARD-STEP-TWO.              IDEN-ONE
023450     MOVE 1 TO B.                                                   IDEN-ONE
023500 CK-THREE.                                                          IDEN-ONE
023550     IF CC (L) = LTR (B) PERFORM ADER.                              IDEN-ONE
023600     IF CC (L) = LTR (B) GO TO COL-STEP.                            IDEN-ONE
023650     IF B = 33 GO TO COL-STEP.                                      IDEN-ONE
023700     ADD 1 TO B.                                                    IDEN-ONE
023750     GO TO CK-THREE.                                                IDEN-ONE
023800 COL-STEP.                                                          IDEN-ONE
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023850     IF N NOT < 72 GO TO BEGIN.                                    IDEN-ONE
023900     ADD 1 TO N.                                                   IDEN-ONE
023950     GO TO DATA-COLL.                                              IDEN-ONE
024000 EOJ.                                                              IDEN-ONE
024050     PERFORM CLOSE-OUT-RT.                                         IDEN-ONE
024100     MOVE SPACES TO PRINT-LINE.                                    IDEN-ONE
024150     WRITE PRINT-LINE AFTER PAGE-TOP.                              IDEN-ONE
024200     CLOSE SAMPLE, RESULT.                                         IDEN-ONE
024250     STOP RUN.                                                     IDEN-ONE
024300 BLANK-COL-STEP.                                                   IDEN-ONE
024350     ADD 1 TO N.                                                   IDEN-ONE
024400     IF N = 73 GO TO BEGIN.                                        IDEN-ONE
024450     GO TO DATA-COLL.                                              IDEN-ONE
024500 CARD-STEP-ONE.                                                    IDEN-ONE
024550     MOVE 2 TO N.                                                  IDEN-ONE
024600     MOVE CC (72) TO CC (2).                                       IDEN-ONE
024650     READ SAMPLE AT END GO TO EOJ.                                 IDEN-ONE
024700     PERFORM DAT-SHIFT VARYING X FROM 1 BY 1 UNTIL X > 71.         IDEN-ONE
024750     ADD 1 TO CARD-NR ON SIZE ERROR GO TO ALERT.                   IDEN-ONE
024800     COMPUTE M = N + 1.                                            IDEN-ONE
024850 CARD-STEP-TWO.                                                    IDEN-ONE
024900     MOVE 1 TO N.                                                  IDEN-ONE
024950     MOVE CC (71) TO CC (1).                                       IDEN-ONE
025000     MOVE CC (72) TO CC (2).                                       IDEN-ONE
025050     READ SAMPLE AT END GO TO EOJ.                                 IDEN-ONE
025100     PERFORM DAT-SHIFT VARYING X FROM 1 BY 1 UNTIL X > 71.         IDEN-ONE
025150     ADD 1 TO CARD-NR ON SIZE ERROR GO TO ALERT.                   IDEN-ONE
025200     COMPUTE L = N + 2.                                            IDEN-ONE
025250 ADER.                                                             IDEN-ONE
025300     COMPUTE B = B + 33.                                           IDEN-ONE
025350     ADD 1 TO FOL-FREQ (A, B) ON SIZE ERROR GO TO ALERT.           IDEN-ONE
025400     COMPUTE B = B - 33.                                           IDEN-ONE
025450 DAT-SHIFT.                                                        IDEN-ONE
025500     COMPUTE Y = X + 2.                                            IDEN-ONE
025550     MOVE CB (X) TO CC (Y).                                        IDEN-ONE
025600 ENG-FILL-1.                                                       IDEN-ONE
025650     IF L = 0 READ SAMPLE AT END GO TO DEFAULT.                    IDEN-ONE
025700     IF L = 0 ADD 1 TO CARD-NR  PERFORM ENG-CK-1.                  IDEN-ONE
025750     ADD 1 TO L.                                                   IDEN-ONE
025800     MOVE CRF-IN (L) TO ENG-ICRF (A).                              IDEN-ONE
025850     ADD 1 TO A.                                                   IDEN-ONE
025900     IF L = 11 MOVE ZERO TO L.                                     IDEN-ONE
025950 ENG-CK-1.                                                         IDEN-ONE
026000     IF DC-ID NOT = 'A' OR DC-SEQ NOT = CARD-NR                    IDEN-ONE
026050          OR DC-LANG NOT = 'ENGLISH P ' GO TO DEFAULT.             IDEN-ONE
026100 ENG-FILL-2.                                                       IDEN-ONE
026150     IF L = 0 READ SAMPLE AT END GO TO DEFAULT.                    IDEN-ONE
026200     IF L = 0 ADD 1 TO CARD-NR  PERFORM ENG-CK-2.                  IDEN-ONE
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026250      ADD 1 TO L.                                                IDEN-ONE
026300      MOVE CRF-IN (L) TO ENG-DCRF (A, B).                        IDEN-ONE
026350      IF B = 33,                                                 IDEN-ONE
026400          ADD 1 TO A,                                            IDEN-ONE
026450          MOVE ZERO TO B.                                        IDEN-ONE
026500      ADD 1 TO B.                                                IDEN-ONE
026550      IF L = 11 MOVE ZERO TO L.                                  IDEN-ONE
026600 ENG-CK-2.                                                       IDEN-ONE
026650      IF DC-ID NOT = 'B' OR DC-SEQ NOT = CARD-NR                 IDEN-ONE
026700          OR DC-LANG NOT = 'ENGLISH P ' GO TO DEFAULT.           IDEN-ONE
026750 ENG-FILL-3.                                                     IDEN-ONE
026800      IF L = 0 READ SAMPLE AT END GO TO DEFAULT.                 IDEN-ONE
026850      IF L = 0 ADD 1 TO CARD-NR  PERFORM ENG-CK-3.               IDEN-ONE
026900      ADD 1 TO L.                                                IDEN-ONE
026950      MOVE CRF-IN (L) TO ENG-DCRF (A, B).                        IDEN-ONE
027000      IF B = 66                                                  IDEN-ONE
027050          ADD 1 TO A,                                            IDEN-ONE
027100          MOVE 33 TO B.                                          IDEN-ONE
027150      ADD 1 TO B.                                                IDEN-ONE
027200      IF L = 11 MOVE ZERO TO L.                                  IDEN-ONE
027250 ENG-CK-3.                                                       IDEN-ONE
027300      IF DC-ID NOT = 'C' OR DC-SEQ NOT = CARD-NR                 IDEN-ONE
027350          OR DC-LANG NOT = 'ENGLISH P ' GO TO DEFAULT.           IDEN-ONE
027400 SPAN-FILL-1.                                                    IDEN-ONE
027450      IF L = 0 READ SAMPLE AT END GO TO DEFAULT.                 IDEN-ONE
027500      IF L = 0 ADD 1 TO CARD-NR  PERFORM SPAN-CK-1.              IDEN-ONE
027550      ADD 1 TO L.                                                IDEN-ONE
027600      MOVE CRF-IN (L) TO SPAN-ICRF (A).                          IDEN-ONE
027650      ADD 1 TO A.                                                IDEN-ONE
027700      IF L = 11 MOVE ZERO TO L.                                  IDEN-ONE
027750 SPAN-CK-1.                                                      IDEN-ONE
027800      IF DC-ID NOT = 'A' OR DC-SEQ NOT = CARD-NR                 IDEN-ONE
027850          OR DC-LANG NOT = 'SPANISH P ' GO TO DEFAULT.           IDEN-ONE
027900 SPAN-FILL-2.                                                    IDEN-ONE
027950      IF L = 0 READ SAMPLE AT END GO TO DEFAULT.                 IDEN-ONE
028000      IF L = 0 ADD 1 TO CARD-NR  PERFORM SPAN-CK-2.              IDEN-ONE
028050      ADD 1 TO L.                                                IDEN-ONE
028100      MOVE CRF-IN (L) TO SPAN-DCRF (A, B).                       IDEN-ONE
028150      IF B = 33,                                                 IDEN-ONE
028200          ADD 1 TO A,                                            IDEN-ONE
028250          MOVE ZERO TO B.                                        IDEN-ONE
028300      ADD 1 TO B.                                                IDEN-ONE
028350      IF L = 11 MOVE ZERO TO L.                                  IDEN-ONE
028400 SPAN-CK-2.                                                      IDEN-ONE
028450      IF DC-ID NOT = 'B' OR DC-SEQ NOT = CARD-NR                 IDEN-ONE
028500          OR DC-LANG NOT = 'SPANISH P ' GO TO DEFAULT.           IDEN-ONE
028550 SPAN-FILL-3.                                                    IDEN-ONE
028600      IF L = 0 READ SAMPLE AT END GO TO DEFAULT.                 IDEN-ONE
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028650      IF L = 0 ADD 1 TO CARD-NR  PERFORM SPAN-CK-3.                IDEN-ONE
028700      ADD 1 TO L.                                                  IDEN-ONE
028750      MOVE CRF-IN (L) TO SPAN-DCRF (A, B).                         IDEN-ONE
028800      IF B = 66,                                                   IDEN-ONE
028850          ADD 1 TO A,                                              IDEN-ONE
028900          MOVE 33 TO B.                                            IDEN-ONE
028950      ADD 1 TO B.                                                  IDEN-ONE
029000      IF L = 11 MOVE ZERO TO L.                                    IDEN-ONE
029050 SPAN-CK-3.                                                        IDEN-ONE
029100      IF DC-ID NOT = 'C' OR DC-SEQ NOT = CARD-NR                   IDEN-ONE
029150          OR DC-LANG NOT = 'SPANISH P ' GO TO DEFAULT.             IDEN-ONE
029200 DEFAULT.                                                          IDEN-ONE
029250      MOVE ' RUN TERMINATED DUE TO INPUT SEQUENCE ERROR ' TO       IDEN-ONE
029300          PRINT-LINE.                                              IDEN-ONE
029350      WRITE PRINT-LINE AFTER PAGE-TOP.                             IDEN-ONE
029400      CLOSE SAMPLE, RESULT.                                        IDEN-ONE
029450      STOP RUN.                                                    IDEN-ONE
029500 ALERT.                                                            IDEN-ONE
029550      WRITE PRINT-LINE FROM ERROR-LINE AFTER PAGE-TOP.             IDEN-ONE
029600 CYCLE.                                                            IDEN-ONE
029650      READ SAMPLE AT END GO TO EOJ.                                IDEN-ONE
029700      IF NEXT-SAMPLE GO TO RESTART.                                IDEN-ONE
029750      GO TO CYCLE.                                                 IDEN-ONE
029800 RESTART.                                                          IDEN-ONE
029850      PERFORM INITIALIZE-RT.                                       IDEN-ONE
029900      PERFORM DAT-SHIFT VARYING X FROM 1 BY 1 UNTIL X > 71.        IDEN-ONE
029950      ADD 1 TO CARD-NR.                                            IDEN-ONE
030000      MOVE 3 TO N.                                                 IDEN-ONE
030050      GO TO DATA-COLL.                                             IDEN-ONE
030100 CLOSE-OUT-RT.                                                     IDEN-ONE
030150      IF CARD-NR = 0 GO TO INITIALIZE-RT.                          IDEN-ONE
030200      PERFORM IND-TOTAL-CALC VARYING A FROM 1 BY 1 UNTIL A > 33.   IDEN-ONE
030250      PERFORM IND-PROB-CALC VARYING A FROM 1 BY 1 UNTIL A > 33.    IDEN-ONE
030300      PERFORM YULE-PREP VARYING A FROM 1 BY 1 UNTIL A > 33.        IDEN-ONE
030350      COMPUTE K ROUNDED = (10000 * (S - ILF-TOTAL)) /              IDEN-ONE
030400          (ILF-TOTAL ** 2).                                        IDEN-ONE
030450      COMPUTE Z-ENG ROUNDED = (K - 645.079) * (CARD-NR ** .5) /    IDEN-ONE
030500          81.497.                                                  IDEN-ONE
030550      COMPUTE Z-SPAN ROUNDED = (K - 751.447) * (CARD-NR ** .5) /   IDEN-ONE
030600          82.328.                                                  IDEN-ONE
030650      PERFOPM LANG-CK-K THRU LANG-CK-K-EXIT.                       IDEN-ONE
030700      WRITE PRINT-LINE FROM TITLE AFTER PAGE-TOP.                  IDEN-ONE
030750      WRITE PRINT-LINE FROM TITLE-UL BEFORE 4.                     IDEN-ONE
030800      WRITE PRINT-LINE FROM COL-HEAD BEFORE 0.                     IDEN-ONE
030850      WRITE PRINT-LINE FROM COL-HEAD-UL BEFORE 2.                  IDEN-ONE
030900      MOVE BANK-FORM TO BANK-ONE.                                  IDEN-ONE
030950      WRITE PRINT-LINE FROM O-LINE-ONE BEFORE 2.                   IDEN-ONE
031000      PERFORM CRILP-CALC VARYING A FROM 2 BY 1 UNTIL A > 33.       IDEN-ONE
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031050      PERFORM DEPN-TWO-SUM VARYING A FROM 1 BY 1 UNTIL A > 33        IDEN-ONE
031100          AFTER B FROM 1 BY 1 UNTIL B > 33.                          IDEN-ONE
031150      PERFORM DEPN-TWO-PROB VARYING A FROM 1 BY 1 UNTIL A > 33       IDEN-ONE
031200          AFTER B FROM 1 BY 1 UNTIL B > 33.                          IDEN-ONE
031250      MOVE ZEROS TO S.                                               IDEN-ONE
031300      PERFORM YULES-K-PREP VARYING A FROM 1 BY 1 UNTIL A > 33        IDEN-ONE
031350          AFTER B FROM 1 BY 1 UNTIL B > 33.                          IDEN-ONE
031400      COMPUTE K ROUNDED = (10000 * (S - FOL-FREQ-TOTAL)) /           IDEN-ONE
031450          (FOL-FREQ-TOTAL ** 2).                                     IDEN-ONE
031500      COMPUTE Z-ENG ROUNDED = (K - 87.168) * (CARD-NR ** .5) /       IDEN-ONE
031550          40.207.                                                    IDEN-ONE
031600      COMPUTE Z-SPAN ROUNDED = (K - 104.553) * (CARD-NR ** .5) /     IDEN-ONE
031650          38.094.                                                    IDEN-ONE
031700      PERFORM LANG-CK-K THRU LANG-CK-K-EXIT.                         IDEN-ONE
031750      MOVE BANK-FORM TO BANK-TWO.                                    IDEN-ONE
031800      WRITE PRINT-LINE FROM O-LINE-TWO BEFORE 2.                     IDEN-ONE
031850      PERFORM CR-FOL-PROB-CALC VARYING A FROM 1 BY 1 UNTIL A > 33    IDEN-ONE
031900          AFTER B FROM 1 BY 1 UNTIL B > 33.                          IDEN-ONE
031950      MOVE FOL-FREQ-TOTAL TO FFT2.                                   IDEN-ONE
032000      MOVE ZEROS TO FOL-FREQ-TOTAL, CRF-TOTAL.                       IDEN-ONE
032050      PERFORM DEPN-TWO-SUM VARYING A FROM 1 BY 1 UNTIL A > 33        IDEN-ONE
032100          AFTER B FROM 34 BY 1 UNTIL B > 66.                         IDEN-ONE
032150      PERFORM DEPN-TWO-PROB VARYING A FROM 1 BY 1 UNTIL A > 33       IDEN-ONE
032200          AFTER B FROM 34 BY 1 UNTIL B > 66.                         IDEN-ONE
032250      MOVE ZEROS TO S.                                               IDEN-ONE
032300      PERFORM YULES-K-PREP VARYING A FROM 1 BY 1 UNTIL A > 33        IDEN-ONE
032350          AFTER B FROM 34 BY 1 UNTIL B > 66.                         IDEN-ONE
032400      COMPUTE K ROUNDED = (10000 * (S - FOL-FREQ-TOTAL)) /           IDEN-ONE
032450          (FOL-FREQ-TOTAL ** 2).                                     IDEN-ONE
032500      COMPUTE Z-ENG ROUNDED = (K - 62.083) * (CARD-NR ** .5) /       IDEN-ONE
032550          42.821.                                                    IDEN-ONE
032600      COMPUTE Z-SPAN ROUNDED = (K - 72.68) * (CARD-NR ** .5) /       IDEN-ONE
032650          35.210.                                                    IDEN-ONE
032700      PERFORM LANG-CK-K THRU LANG-CK-K-EXIT.                         IDEN-ONE
032750      MOVE BANK-FORM TO BANK-THREE.                                  IDEN-ONE
032800      WRITE PRINT-LINE FROM O-LINE-THREE BEFORE 2.                   IDEN-ONE
032850      PERFORM CR-FOL-PROB-CALC VARYING A FROM 1 BY 1 UNTIL A > 33    IDEN-ONE
032900          AFTER B FROM 34 BY 1 UNTIL B > 66.                         IDEN-ONE
032950      COMPUTE VC-TOTAL = F-CONS-CONS + F-VOW-CONS + F-CONS-VOW       IDEN-ONE
033000          + F-VOW-VOW ON SIZE ERROR GO TO ALERT.                     IDEN-ONE
033050      IF F-VOW-VOW > 0                                               IDEN-ONE
033100          COMPUTE VC-CRF (1) ROUNDED = F-VOW-VOW / VC-TOTAL          IDEN-ONE
033150          ELSE MOVE ZEROS TO VC-CRF (1).                             IDEN-ONE
033200      IF F-CONS-VOW > 0                                              IDEN-ONE
033250          COMPUTE VC-CRF (2) ROUNDED = (F-CONS-VOW / VC-TOTAL)       IDEN-ONE
033300              + VC-CRF (1)                                           IDEN-ONE
033350          ELSE MOVE VC-CRF (1) TO VC-CRF (2).                        IDEN-ONE
033400      IF F-VOW-CONS > 0                                              IDEN-ONE
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033450          COMPUTE VC-CRF (3) ROUNDED = (F-VOW-CONS / VC-TOTAL)      IDEN-ONE
033500              + VC-CRF (2)                                          IDEN-ONE
033550          ELSE MOVE VC-CRF (2) TO VC-CRF (3).                       IDEN-ONE
033600      IF F-CONS-CONS > 0                                            IDEN-ONE
033650          COMPUTE VC-CRF (4) ROUNDED = (F-CONS-CONS / VC-TOTAL)     IDEN-ONE
033700              + VC-CRF (3)                                          IDEN-ONE
033750          ELSE MOVE VC-CRF (3) TO VC-CRF (4).                       IDEN-ONE
033800      PERFORM ENG-VC-DCK VARYING A FROM 1 BY 1 UNTIL A > 4.         IDEN-ONE
033850      PERFORM SPAN-VC-DCK VARYING A FROM 1 BY 1 UNTIL A > 4.        IDEN-ONE
033900      MOVE VC-TOTAL TO SAMPLE-SIZE.                                 IDEN-ONE
033950      PERFORM LANG-CK-KS.                                           IDEN-ONE
034000      MOVE BANK-FORM TO BANK-FOUR.                                  IDEN-ONE
034050      WRITE PRINT-LINE FROM O-LINE-FOUR BEFORE 2.                   IDEN-ONE
034100      MOVE ZEROS TO ENG-D, SPAN-D.                                  IDEN-ONE
034150      PERFORM ENG-KS-CK1 VARYING A FROM 1 BY 1 UNTIL A > 33.        IDEN-ONE
034200      PERFORM SPAN-KS-CK1 VARYING A FROM 1 BY 1 UNTIL A > 33.       IDEN-ONE
034250      MOVE ILF-TOTAL TO SAMPLE-SIZE.                                IDEN-ONE
034300      PERFORM LANG-CK-KS.                                           IDEN-ONE
034350      MOVE BANK-FORM TO BANK-FIVE.                                  IDEN-ONE
034400      WRITE PRINT-LINE FROM O-LINE-FIVE BEFORE 2.                   IDEN-ONE
034450      MOVE ZEROS TO ENG-D, SPAN-D.                                  IDEN-ONE
034500      PERFORM ENG-KS-CK2 VARYING A FROM 1 BY 1 UNTIL A > 33         IDEN-ONE
034550          AFTER B FROM 1 BY 1 UNTIL B > 33.                         IDEN-ONE
034600      PERFORM SPAN-KS-CK2 VARYING A FROM 1 BY 1 UNTIL A > 33        IDEN-ONE
034650          AFTER B FROM 1 BY 1 UNTIL B > 33.                         IDEN-ONE
034700      MOVE FFT2 TO SAMPLE-SIZE.                                     IDEN-ONE
034750      PERFORM LANG-CK-KS.                                           IDEN-ONE
034800      MOVE BANK-FORM TO BANK-SIX.                                   IDEN-ONE
034850      WRITE PRINT-LINE FROM O-LINE-SIX BEFORE 2.                    IDEN-ONE
034900      MOVE ZEROS TO ENG-D, SPAN-D.                                  IDEN-ONE
034950      PERFORM ENG-KS-CK2 VARYING A FROM 1 BY 1 UNTIL A > 33         IDEN-ONE
035000          AFTER B FROM 34 BY 1 UNTIL B > 66.                        IDEN-ONE
035050      PERFORM SPAN-KS-CK2 VARYING A FROM 1 BY 1 UNTIL A > 33        IDEN-ONE
035100          AFTER B FROM 34 BY 1 UNTIL B > 66.                        IDEN-ONE
035150      MOVE FOL-FREQ-TOTAL TO SAMPLE-SIZE.                           IDEN-ONE
035200      PERFORM LANG-CK-KS.                                           IDEN-ONE
035250      MOVE BANK-FORM TO BANK-SEVEN.                                 IDEN-ONE
035300      WRITE PRINT-LINE FROM O-LINE-SEVEN BEFORE 2.                  IDEN-ONE
035350      MOVE ILF-TOTAL TO BANK-EIGHT.                                 IDEN-ONE
035400      MOVE CARD-NR TO C-CARD-NR.                                    IDEN-ONE
035450      WRITE PRINT-LINE FROM O-LINE-EIGHT AFTER 2.                   IDEN-ONE
035500  INITIALIZE-RT.                                                    IDEN-ONE
035550      MOVE TEST-NAME TO ANS, ERROR-ANS.                             IDEN-ONE
035600      MOVE ZEROS TO A, B, N, S, L, M, X, Y, VC-TOTAL, F-CONS-CONS,  IDEN-ONE
035650          F-VOW-CONS, F-CONS-VOW, F-VOW-VOW, FOL-FREQ-TOTAL,        IDEN-ONE
035700          ILF-TOTAL, CARD-NR, K, Z-ENG, Z-SPAN, Z, P, J, Z2,        IDEN-ONE
035750          CRF-TOTAL, D, ENG-D, SPAN-D, SAMPLE-SIZE, E, T, FFT2.     IDEN-ONE
035800      PERFORM ZEROING-ONE VARYING A FROM 1 BY 1 UNTIL A > 33.       IDEN-ONE
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035850      PERFORM ZEROING-TWO VARYING A FROM 1 BY 1 UNTIL A > 33          IDEN-ONE
035900          AFTER B FROM 1 BY 1 UNTIL B > 66.                           IDEN-ONE
035950      READ SAMPLE AT END GO TO DEFAULT.                               IDEN-ONE
036000 LANG-CK-K.                                                           IDEN-ONE
036050      IF Z-ENG = Z-SPAN,                                              IDEN-ONE
036100          MOVE 'NO DECSN' TO BANK-LANG,                               IDEN-ONE
036150          MOVE Z-ENG TO Z.                                            IDEN-ONE
036200      IF Z-ENG > Z-SPAN,                                              IDEN-ONE
036250          MOVE 'SPANISH' TO BANK-LANG,                                IDEN-ONE
036300          MOVE Z-SPAN TO Z.                                           IDEN-ONE
036350      IF Z-ENG < Z-SPAN,                                              IDEN-ONE
036400          MOVE 'ENGLISH' TO BANK-LANG,                                IDEN-ONE
036450          MOVE Z-ENG TO Z.                                            IDEN-ONE
036500      IF Z > 4                                                        IDEN-ONE
036550          MOVE 0.000060 TO BANK-ALFA                                  IDEN-ONE
036600          MOVE '<' TO BANK-EQUAL                                      IDEN-ONE
036650          GO TO LANG-CK-K-EXIT.                                       IDEN-ONE
036700      COMPUTE Z2 ROUNDED = Z ** 2.                                    IDEN-ONE
036750      COMPUTE P ROUNDED = (1 / 6) * Z2.                               IDEN-ONE
036800      COMPUTE J = 1 - P ON SIZE ERROR GO TO ALERT.                    IDEN-ONE
036850      COMPUTE P ROUNDED = (P / 6.66666666667) * Z2.                   IDEN-ONE
036900      COMPUTE J = J + P ON SIZE ERROR GO TO ALERT.                    IDEN-ONE
036950      COMPUTE P ROUNDED = (P / 8.4) * Z2.                             IDEN-ONE
037000      COMPUTE J = J - P ON SIZE ERROR GO TO ALERT.                    IDEN-ONE
037050      COMPUTE P ROUNDED = (P / 10.28571428571) * Z2.                  IDEN-ONE
037100      COMPUTE J = J + P ON SIZE ERROR GO TO ALERT.                    IDEN-ONE
037150      COMPUTE P ROUNDED = (P / 12.22222222222) * Z2.                  IDEN-ONE
037200      COMPUTE J = J - P ON SIZE ERROR GO TO ALERT.                    IDEN-ONE
037250      COMPUTE P ROUNDED = (P / 14.18181818182) * Z2.                  IDEN-ONE
037300      COMPUTE J = J + P ON SIZE ERROR GO TO ALERT.                    IDEN-ONE
037350      COMPUTE P ROUNDED = (P / 16.15384615385) * Z2.                  IDEN-ONE
037400      COMPUTE J = J - P ON SIZE ERROR GO TO ALERT.                    IDEN-ONE
037450      COMPUTE P ROUNDED = (P / 18.13333333333) * Z2.                  IDEN-ONE
037500      COMPUTE J = J + P ON SIZE ERROR GO TO ALERT.                    IDEN-ONE
037550      COMPUTE P ROUNDED = (P / 20.11764705882) * Z2.                  IDEN-ONE
037600      COMPUTE J = J - P ON SIZE ERROR GO TO ALERT.                    IDEN-ONE
037650      COMPUTE P ROUNDED = (P / 22.10526315789) * Z2.                  IDEN-ONE
037700      COMPUTE J = J + P ON SIZE ERROR GO TO ALERT.                    IDEN-ONE
037750      COMPUTE P ROUNDED = (P / 24.09523809524) * Z2.                  IDEN-ONE
037800      COMPUTE J = J - P ON SIZE ERROR GO TO ALERT.                    IDEN-ONE
037850      COMPUTE P ROUNDED = (P / 26.08695652174) * Z2.                  IDEN-ONE
037900      COMPUTE J = J + P ON SIZE ERROR GO TO ALERT.                    IDEN-ONE
037950      COMPUTE P ROUNDED = (P / 28.08) * Z2.                           IDEN-ONE
038000      COMPUTE J = J - P ON SIZE ERROR GO TO ALERT.                    IDEN-ONE
038050      COMPUTE P ROUNDED = (P / 30.07407407407) * Z2.                  IDEN-ONE
038100      COMPUTE J = J + P ON SIZE ERROR GO TO ALERT.                    IDEN-ONE
038150      COMPUTE P ROUNDED = (P / 32.06896551724) * Z2.                  IDEN-ONE
038200      COMPUTE J = J - P ON SIZE ERROR GO TO ALERT.                    IDEN-ONE
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038250      COMPUTE P ROUNDED = (P / 34.06451612903) * Z2.                IDEN-ONE
038300      COMPUTE J = J + P ON SIZE ERROR GO TO ALERT.                  IDEN-ONE
038350      COMPUTE P ROUNDED = (P / 36.06060606061) * Z2.                IDEN-ONE
038400      COMPUTE J = J - P ON SIZE ERROR GO TO ALERT.                  IDEN-ONE
038450      COMPUTE P ROUNDED = (P / 38.05714285714) * Z2.                IDEN-ONE
038500      COMPUTE J = J + P ON SIZE ERROR GO TO ALERT.                  IDEN-ONE
038550      COMPUTE P ROUNDED = (P / 40.05405405405) * Z2.                IDEN-ONE
038600      COMPUTE J = J - P ON SIZE ERROR GO TO ALERT.                  IDEN-ONE
038650      COMPUTE P ROUNDED = (P / 42.05128205128) * Z2.                IDEN-ONE
038700      COMPUTE J = J + P ON SIZE ERROR GO TO ALERT.                  IDEN-ONE
038750      COMPUTE P ROUNDED = (P / 44.04878048780) * Z2.                IDEN-ONE
038800      COMPUTE J = J - P ON SIZE ERROR GO TO ALERT.                  IDEN-ONE
038850      COMPUTE P ROUNDED = (P / 46.04651162791) * Z2.                IDEN-ONE
038900      COMPUTE J = J + P ON SIZE ERROR GO TO ALERT.                  IDEN-ONE
038950      COMPUTE P ROUNDED = (P / 48.04444444444) * Z2.                IDEN-ONE
039000      COMPUTE J = J - P ON SIZE ERROR GO TO ALERT.                  IDEN-ONE
039050      COMPUTE P ROUNDED = (P / 50.042553191) * Z2.                  IDEN-ONE
039100      COMPUTE J = J + P ON SIZE ERROR GO TO ALERT.                  IDEN-ONE
039150      COMPUTE P ROUNDED = (P / 52.040816326) * Z2.                  IDEN-ONE
039200      COMPUTE J = J - P ON SIZE ERROR GO TO ALERT.                  IDEN-ONE
039250      COMPUTE P ROUNDED = (P / 54.039215686) * Z2.                  IDEN-ONE
039300      COMPUTE J = J + P ON SIZE ERROR GO TO ALERT.                  IDEN-ONE
039350      COMPUTE P ROUNDED = (P / 56.037735849) * Z2.                  IDEN-ONE
039400      COMPUTE J = J - P ON SIZE ERROR GO TO ALERT.                  IDEN-ONE
039450      COMPUTE P ROUNDED = (P / 58.03636) * Z2.                      IDEN-ONE
039500      COMPUTE J = J + P ON SIZE ERROR GO TO ALERT.                  IDEN-ONE
039550      COMPUTE P ROUNDED = (P / 60.03509) * Z2.                      IDEN-ONE
039600      COMPUTE J = J - P ON SIZE ERROR GO TO ALERT.                  IDEN-ONE
039650      COMPUTE P ROUNDED = (P / 62.03) * Z2.                         IDEN-ONE
039700      COMPUTE J = J + P ON SIZE ERROR GO TO ALERT.                  IDEN-ONE
039750      COMPUTE BANK-ALFA ROUNDED = 1 - (2 * (Z * .3989422804014 *    IDEN-ONE
039800          J)).                                                      IDEN-ONE
039850      MOVE SPACES TO BANK-EQUAL.                                    IDEN-ONE
039900 LANG-CK-K-EXIT.  EXIT.                                             IDEN-ONE
039950 CRILP-CALC.                                                        IDEN-ONE
040000      COMPUTE B = A - 1.                                            IDEN-ONE
040050      COMPUTE ILP (A) = ILP (B) + ILP (A).                          IDEN-ONE
040100 IND-TOTAL-CALC.                                                    IDEN-ONE
040150      COMPUTE ILF-TOTAL = ILF-TOTAL + ILF (A).                      IDEN-ONE
040200 IND-PROB-CALC.                                                     IDEN-ONE
040250      IF ILF (A) > 0 COMPUTE ILP (A) ROUNDED =                      IDEN-ONE
040300          (ILF (A) / ILF-TOTAL), ELSE MOVE ZEROS TO ILP (A).        IDEN-ONE
040350 YULE-PREP.                                                         IDEN-ONE
040400      COMPUTE S = S + (ILF (A) ** 2).                               IDEN-ONE
040450 DEPN-TWO-SUM.                                                      IDEN-ONE
040500      COMPUTE FOL-FREQ-TOTAL = FOL-FREQ-TOTAL + FOL-FREQ (A, B).    IDEN-ONE
040550 DEPN-TWO-PROB.                                                     IDEN-ONE
040600      IF FOL-FREQ (A, B) > 0 COMPUTE FOL-PROB (A, B) ROUNDED =      IDEN-ONE
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040650          (FOL-FREQ (A, B) / FOL-FREQ-TOTAL), ELSE MOVE ZEROS        IDEN-ONE
040700          TO FOL-PROB (A, B).                                        IDEN-ONE
040750 YULES-K-PREP.                                                       IDEN-ONE
040800     COMPUTE S = S + (FOL-FREQ (A, B) ** 2).                         IDEN-ONE
040850 CR-FOL-PROB-CALC.                                                   IDEN-ONE
040900     COMPUTE CRF-TOTAL = CRF-TOTAL + FOL-PROB (A, B).                IDEN-ONE
040950     MOVE CRF-TOTAL TO FOL-PROB (A, B).                              IDEN-ONE
041000 ENG-VC-DCK.                                                          IDEN-ONE
041050     COMPUTE D = ENG-VC-CRF (A) - VC-CRF (A).                        IDEN-ONE
041100     IF D > ENG-D MOVE D TO ENG-D.                                   IDEN-ONE
041150 SPAN-VC-DCK.                                                        IDEN-ONE
041200     COMPUTE D = SPAN-VC-CRF (A) - VC-CRF (A).                       IDEN-ONE
041250     IF D > SPAN-D MOVE D TO SPAN-D.                                 IDEN-ONE
041300 LANG-CK-KS.                                                         IDEN-ONE
041350     IF ENG-D = SPAN-D,                                              IDEN-ONE
041400          MOVE 'NO DECSN' TO BANK-LANG,                              IDEN-ONE
041450          MOVE ENG-D TO D.                                           IDEN-ONE
041500     IF ENG-D > SPAN-D,                                              IDEN-ONE
041550          MOVE 'SPANISH' TO BANK-LANG,                               IDEN-ONE
041600          MOVE SPAN-D TO D.                                          IDEN-ONE
041650     IF ENG-D < SPAN-D,                                              IDEN-ONE
041700          MOVE 'ENGLISH' TO BANK-LANG,                               IDEN-ONE
041750          MOVE ENG-D TO D.                                           IDEN-ONE
041800     COMPUTE Z2 ROUNDED = SAMPLE-SIZE ** .5.                         IDEN-ONE
041850     COMPUTE E ROUNDED = D * Z2.                                     IDEN-ONE
041900     IF E < .28,                                                     IDEN-ONE
041950          MOVE '>' TO BANK-EQUAL,                                    IDEN-ONE
042000          MOVE KS-ALFA (1) TO BANK-ALFA.                             IDEN-ONE
042050     IF E > 1.82,                                                    IDEN-ONE
042100          MOVE '<' TO BANK-EQUAL,                                    IDEN-ONE
042150          MOVE KS-ALFA (155) TO BANK-ALFA.                           IDEN-ONE
042200     IF E > .27 AND E < 1.83,                                        IDEN-ONE
042250          COMPUTE T ROUNDED = (100 * E) - 27,                        IDEN-ONE
042300          MOVE KS-ALFA (T) TO BANK-ALFA,                             IDEN-ONE
042350          MOVE SPACES TO BANK-EQUAL.                                 IDEN-ONE
042400 ENG-KS-CK1.                                                         IDEN-ONE
042450     COMPUTE D = ENG-ICRF (A) - ILP (A).                             IDEN-ONE
042500     IF D > ENG-D MOVE D TO ENG-D.                                   IDEN-ONE
042550 SPAN-KS-CK1.                                                        IDEN-ONE
042600     COMPUTE D = SPAN-ICRF (A) - ILP (A).                            IDEN-ONE
042650     IF D > SPAN-D MOVE D TO SPAN-D.                                 IDEN-ONE
042700 ENG-KS-CK2.                                                         IDEN-ONE
042750     COMPUTE D = ENG-DCRF (A, B) - FOL-PROB (A, B).                  IDEN-ONE
042800     IF D > ENG-D MOVE D TO ENG-D.                                   IDEN-ONE
042850 SPAN-KS-CK2.                                                        IDEN-ONE
042900     COMPUTE D = SPAN-DCRF (A, B) - FOL-PROB (A, B).                 IDEN-ONE
042950     IF D > SPAN-D MOVE D TO SPAN-D.                                 IDEN-ONE
043000 ZEROING-ONE.                                                        IDEN-ONE
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043050      MOVE ZEROS TO ILF (A), ILP (A).                          IDEN-ONE
043100 ZEROING-TWO.                                                  IDEN-ONE
043150      MOVE ZEROS TO FOL-FREQ (A, B), FOL-PROB (A, B).          IDEN-ONE
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APPENDIX J. LANGUAGE IDENTIFICATICN PROGRAM (V-2)

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000050 IDENTIFICATION DIVISION.                                        IDEN-TWO
000100 PROGRAM-ID.  LANGUAGE-ID-VERSION-TWO.                           IDEN-TWO
000150 AUTHOR.  LCDR. MORTON D. RAU, USN.                              IDEN-TWO
000200 REMARKS.  THIS PROGRAM IS PART OF MY MASTER OF SCIENCE IN       IDEN-TWO
000250     MANAGEMENT THESIS AND IS DESIGNED TO IDENTIFY SHORT SAMPLE  IDEN-TWO
000300     TEXT OF A LANGUAGE AS EITHER ENGLISH OR SPANISH.  THE       IDEN-TWO
000350     DECISION IS BASED ON STATISTICAL CHARACTERISTICS OF LETTERS, IDEN-TWO
000400     THE SPACE RATE AND THE INTERDEPENDENCY OF LETTERS IN        IDEN-TWO
000450     ADJOINING WORDS.                                            IDEN-TWO
000500         INPUT DATA MUST APPEAR IN THE FOLLCWING ORDER:          IDEN-TWO
000550             4 ENGLISH D CARDS - ICRF TABLE VALUES               IDEN-TWO
000600             106 ENGLISH E CARDS- DCRF TABLE VALUES X(2)/X(1)    IDEN-TWO
000650             106 ENGLISH F CARDS - DCRF TABLE VALUES X(3)/X(1)   IDEN-TWO
000700             4 SPANISH D CAPDS - ICRF TABLE VALUES               IDEN-TWO
000750             106 SPANISH E CARDS - DCRF TABLE VALUES X(2)/X(1)   IDEN-TWO
000800             106 SPANISH F CARDS - DCRF TABLE VALUES X(3)/X(1)   IDEN-TWO
000850             1 HEAD CARD PRECEEDING EACH GRCUP OF SAMPLE CARDS.  IDEN-TWO
000900         MAXIMUM NR OF SAMPLE CARDS PER TEST IS 999 OR 9,999     IDEN-TWO
000950     INDIVIDUAL CHARACTERS, INCLUDING SPACES.                    IDEN-TWO
001000 ENVIRCNMENT DIVISION.                                            IDEN-TWO
001050 CONFIGURATION SECTION.                                           IDEN-TWO
001100 SCURCE-COMPUTER.  IBM-360-67.                                    IDEN-TWO
001150 OBJECT-COMPUTER.  IBM-360-67.                                    IDEN-TWO
001200 SPECIAL-NAMES.                                                   IDEN-TWO
001250     C01 IS PAGE-TOP.                                            IDEN-TWO
001300 INPUT-OUTPUT SECTION.                                            IDEN-TWO
001350 FILE-CONTROL.                                                    IDEN-TWO
001400     SELECT SAMPLE ASSIGN TO UR-S-IN1.                           IDEN-TWO
001450     SELECT RESULT ASSIGN TO UR-S-OUT1.                          IDEN-TWO
001500 DATA DIVISION.                                                   IDEN-TWO
001550 FILE SECTION.                                                    IDEN-TWO
001600 FD  SAMPLE                                                       IDEN-TWO
001650     LABEL RECORDS ARE OMITTED                                   IDEN-TWO
001700     BLOCK CONTAINS 5 RECORDS                                    IDEN-TWO
001750     DATA RECORD IS SAMPLE-CARD, HEAD-CARD, DATA-CARD.           IDEN-TWO
001800 01  SAMPLE-CARD.                                                IDEN-TWO
001850     05  FILLER                 PIC XX.                          IDEN-TWO
001900     05  SAMPLE-FLD.                                             IDEN-TWO
001950         10  CC                 PIC X, OCCURS 71 TIMES.          IDEN-TWO
002000     05  FILLER                 PIC X(7).                        IDEN-TWO
002050 01  HEAD-CARD.                                                  IDEN-TWO
002100     05  CARD-TYPE              PIC A.                           IDEN-TWO
002150         88  NEXT-SAMPLE VALUE 'X'.                              IDEN-TWO
002200     05  FILLER                 PIC X.                           IDEN-TWO
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002250      05  TEST-NAME              PIC X(20).                          IDEN-TWO
002300      05  FILLER                 PIC X(58).                          IDEN-TWO
002350 01   DATA-CARD.                                                      IDEN-TWO
002400      05  DC-ID                  PIC A.                              IDEN-TWO
002450      05  DC-SEQ                 PIC 999.                            IDEN-TWO
002500      05  DC-LANG                PIC X(10).                          IDEN-TWO
002550      05  CRF-IN                 PIC 9V9(5), OCCURS 11 TIMES.        IDEN-TWO
002600 FD   RESULT                                                         IDEN-TWO
002650      LABEL RECORDS ARE OMITTED                                      IDEN-TWO
002700      BLOCK CONTAINS 5 RECORDS                                       IDEN-TWO
002750      DATA RECORD IS PRINT-LINE.                                     IDEN-TWO
002800 01   PRINT-LINE                 PIC X(133).                         IDEN-TWO
002850 WORKING-STORAGE SECTION.                                            IDEN-TWO
002900 77   A                          PIC 99, COMP, SYNC.                 IDEN-TWO
002950 77   B                          PIC 99, COMP, SYNC.                 IDEN-TWO
003000 77   N                          PIC 99, COMP, SYNC.                 IDEN-TWO
003050 77   S                          PIC 9(12), COMP, SYNC.              IDEN-TWO
003100 77   L                          PIC 99, COMP, SYNC.                 IDEN-TWO
003150 77   M                          PIC 99, COMP, SYNC.                 IDEN-TWO
003200 77   X                          PIC 99, COMP, SYNC.                 IDEN-TWO
003250 77   Y                          PIC 99, COMP, SYNC.                 IDEN-TWO
003300 77   VC-TOTAL                  PIC 9(4).                           IDEN-TWO
003350 77   F-CONS-CONS               PIC 9(4), COMP, SYNC.               IDEN-TWO
003400 77   F-VOW-CONS                PIC 9(4), COMP, SYNC.               IDEN-TWO
003450 77   F-CONS-VOW                PIC 9(4), COMP, SYNC.               IDEN-TWO
003500 77   F-VOW-VOW                 PIC 9(4), COMP, SYNC.               IDEN-TWO
003550 77   FOL-FREQ-TOTAL            PIC 9(4), COMP, SYNC.               IDEN-TWO
003600 77   ILF-TOTAL                 PIC 9(4), COMP, SYNC.               IDEN-TWO
003650 77   CARD-NR                   PIC 9(3), COMP, SYNC.               IDEN-TWO
003700 77   K                          PIC 9(13)V999.                      IDEN-TWO
003750 77   Z-ENG                     PIC 9(5)V999 COMP, SYNC.            IDEN-TWO
003800 77   Z-SPAN                    PIC 9(5)V999 COMP, SYNC.            IDEN-TWO
003850 77   Z                          PIC 99V999 COMP, SYNC.              IDEN-TWO
003900 77   P                          PIC 999V9(12) COMP, SYNC.           IDEN-TWO
003950 77   J                          PIC S999V9(12) COMP, SYNC.          IDEN-TWO
004000 77   Z2                         PIC 999V9(6) COMP, SYNC.            IDEN-TWO
004050 77   CRF-TOTAL                 PIC 9V9(5), COMP-3.                 IDEN-TWO
004100 77   D                          PIC 9V9(5), COMP, SYNC.             IDEN-TWO
004150 77   ENG-D                     PIC 9V9(5), COMP, SYNC.             IDEN-TWO
004200 77   SPAN-D                    PIC 9V9(5), COMP, SYNC.             IDEN-TWO
004250 77   SAMPLE-SIZE               PIC 9(4), COMP, SYNC.               IDEN-TWO
004300 77   E                          PIC 99V99 COMP, SYNC.               IDEN-TWO
004350 77   T                          PIC 999, COMP, SYNC.                IDEN-TWO
004400 77   FFT2                       PIC 9(4).                           IDEN-TWO
004450 77   MATCH                      PIC 9.                              IDEN-TWO
004500 01   LTR-TABLE-VALUES.                                             IDEN-TWO
004550      05  FILLER                 PIC X VALUE 'A'.                    IDEN-TWO
004600      05  FILLER                 PIC X VALUE 'E'.                    IDEN-TWO
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004650      05  FILLER                 PIC X VALUE 'I'.                        IDEN-TWO
004700      05  FILLER                 PIC X VALUE 'O'.                        IDEN-TWO
004750      05  FILLER                 PIC X VALUE 'U'.                        IDEN-TWO
004800      05  FILLER                 PIC X VALUE '1'.                        IDEN-TWO
004850      05  FILLER                 PIC X VALUE '2'.                        IDEN-TWO
004900      05  FILLER                 PIC X VALUE '3'.                        IDEN-TWO
004950      05  FILLER                 PIC X VALUE '4'.                        IDEN-TWO
005000      05  FILLER                 PIC X VALUE '5'.                        IDEN-TWO
005050      05  FILLER                 PIC X VALUE 'B'.                        IDEN-TWO
005100      05  FILLER                 PIC X VALUE 'C'.                        IDEN-TWO
005150      05  FILLER                 PIC X VALUE 'D'.                        IDEN-TWO
005200      05  FILLER                 PIC X VALUE 'F'.                        IDEN-TWO
005250      05  FILLER                 PIC X VALUE 'G'.                        IDEN-TWO
005300      05  FILLER                 PIC X VALUE 'H'.                        IDEN-TWO
005350      05  FILLER                 PIC X VALUE 'J'.                        IDEN-TWO
005400      05  FILLER                 PIC X VALUE 'K'.                        IDEN-TWO
005450      05  FILLER                 PIC X VALUE 'L'.                        IDEN-TWO
005500      05  FILLER                 PIC X VALUE 'M'.                        IDEN-TWO
005550      05  FILLER                 PIC X VALUE 'N'.                        IDEN-TWO
005600      05  FILLER                 PIC X VALUE 'P'.                        IDEN-TWO
005650      05  FILLER                 PIC X VALUE 'Q'.                        IDEN-TWO
005700      05  FILLER                 PIC X VALUE 'R'.                        IDEN-TWO
005750      05  FILLER                 PIC X VALUE 'S'.                        IDEN-TWO
005800      05  FILLER                 PIC X VALUE 'T'.                        IDEN-TWO
005850      05  FILLER                 PIC X VALUE 'V'.                        IDEN-TWO
005900      05  FILLER                 PIC X VALUE 'W'.                        IDEN-TWO
005950      05  FILLER                 PIC X VALUE 'X'.                        IDEN-TWO
006000      05  FILLER                 PIC X VALUE 'Y'.                        IDEN-TWO
006050      05  FILLER                 PIC X VALUE 'Z'.                        IDEN-TWO
006100      05  FILLER                 PIC X VALUE '6'.                        IDEN-TWO
006150      05  FILLER                 PIC X VALUE '7'.                        IDEN-TWO
006200  01  LTR-TABLE REDEFINES LTR-TABLE-VALUES.                              IDEN-TWO
006250      05  LTR                    PIC X OCCURS 33 TIMES.                  IDEN-TWO
006300  01  ENG-ICRF-TABLE.                                                    IDEN-TWO
006350      05  ENG-ICRF               PIC 9V9(5) OCCURS 34 TIMES.             IDEN-TWO
006400  01  SPAN-ICRF-TABLE.                                                   IDEN-TWO
006450      05  SPAN-ICRF              PIC 9V9(5) OCCURS 34 TIMES.             IDEN-TWO
006500  01  ENG-DCRF-TABLE.                                                    IDEN-TWO
006550      05  ENG-FST-LTR            OCCURS 34 TIMES.                        IDEN-TWO
006600          10  ENG-DCRF           PIC 9V9(5) COMP SYNC OCCURS 68 TIMES.IDEN-TWO
006650  01  SPAN-DCRF-TABLE.                                                   IDEN-TWO
006700      05  SPAN-FST-LTR           OCCURS 34 TIMES.                        IDEN-TWO
006750          10  SPAN-DCRF          PIC 9V9(5) COMP SYNC OCCURS 68 TIMES.IDEN-TWO
006800  01  ENG-VC-CRF-TABLE-VALUES.                                           IDEN-TWO
006850      05  FILLER                 PIC 9V9(5) VALUE 0.05118.               IDEN-TWO
006900      05  FILLER                 PIC 9V9(5) VALUE 0.40611.               IDEN-TWO
006950      05  FILLER                 PIC 9V9(5) VALUE 0.76278.               IDEN-TWO
007000      05  FILLER                 PIC 9V9(5) VALUE 1.00000.               IDEN-TWO
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007050 01  ENG-VC-CRF-TABLE REDEFINES ENG-VC-CRF-TABLE-VALUES.          IDEN-TWO
007100     05  ENG-VC-CRF            PIC 9V9(5) OCCURS 4 TIMES.         IDEN-TWO
007150 01  SPAN-VC-CRF-TABLE-VALUES.                                    IDEN-TWO
007200     05  FILLER                PIC 9V9(5) VALUE 0.06163.          IDEN-TWO
007250     05  FILLER                PIC 9V9(5) VALUE 0.43293.          IDEN-TWO
007300     05  FILLER                PIC 9V9(5) VALUE 0.87982.          IDEN-TWO
007350     05  FILLER                PIC 9V9(5) VALUE 1.00000.          IDEN-TWO
007400 01  SPAN-VC-CRF-TABLE REDEFINES SPAN-VC-CRF-TABLE-VALUES.         IDEN-TWO
007450     05  SPAN-VC-CRF           PIC 9V9(5) OCCURS 4 TIMES.         IDEN-TWO
007500 01  IND-FREQ-TABLE.                                              IDEN-TWO
007550     05  ILF                   PIC 9(4) COMP SYNC OCCURS 34 TIMES. IDEN-TWO
007600 01  DEPENDENCY-FREQ-TABLE.                                       IDEN-TWO
007650     05  FST-LTR               OCCURS 34 TIMES.                   IDEN-TWO
007700         10  FOL-FREQ          PIC 9(4) COMP SYNC OCCURS 68 TIMES. IDEN-TWO
007750 01  DEPENDENCY-PROB-TABLE.                                       IDEN-TWO
007800     05  GIVEN-LTR             OCCURS 34 TIMES.                   IDEN-TWO
007850         10  FOL-PROB          PIC 9V9(5) COMP SYNC OCCURS 68 TIMES.IDEN-TWO
007900 01  KS-ALFA-TABLE-VALUES.                                        IDEN-TWO
007950     05  FILLER                PIC V9(6) VALUE .999999.           IDEN-TWO
008000     05  FILLER                PIC V9(6) VALUE .999996.           IDEN-TWO
008050     05  FILLER                PIC V9(6) VALUE .999991.           IDEN-TWO
008100     05  FILLER                PIC V9(6) VALUE .999979.           IDEN-TWO
008150     05  FILLER                PIC V9(6) VALUE .999954.           IDEN-TWO
008200     05  FILLER                PIC V9(6) VALUE .999909.           IDEN-TWO
008250     05  FILLER                PIC V9(6) VALUE .999829.           IDEN-TWO
008300     05  FILLER                PIC V9(6) VALUE .999697.           IDEN-TWO
008350     05  FILLER                PIC V9(6) VALUE .999489.           IDEN-TWO
008400     05  FILLER                PIC V9(6) VALUE .999174.           IDEN-TWO
008450     05  FILLER                PIC V9(6) VALUE .998715.           IDEN-TWO
008500     05  FILLER                PIC V9(6) VALUE .998071.           IDEN-TWO
008550     05  FILLER                PIC V9(6) VALUE .997192.           IDEN-TWO
008600     05  FILLER                PIC V9(6) VALUE .996028.           IDEN-TWO
008650     05  FILLER                PIC V9(6) VALUE .994524.           IDEN-TWO
008700     05  FILLER                PIC V9(6) VALUE .992623.           IDEN-TWO
008750     05  FILLER                PIC V9(6) VALUE .990270.           IDEN-TWO
008800     05  FILLER                PIC V9(6) VALUE .987410.           IDEN-TWO
008850     05  FILLER                PIC V9(6) VALUE .983995.           IDEN-TWO
008900     05  FILLER                PIC V9(6) VALUE .979978.           IDEN-TWO
008950     05  FILLER                PIC V9(6) VALUE .975318.           IDEN-TWO
009000     05  FILLER                PIC V9(6) VALUE .969983.           IDEN-TWO
009050     05  FILLER                PIC V9(6) VALUE .963945.           IDEN-TWO
009100     05  FILLER                PIC V9(6) VALUE .957186.           IDEN-TWO
009150     05  FILLER                PIC V9(6) VALUE .949694.           IDEN-TWO
009200     05  FILLER                PIC V9(6) VALUE .941466.           IDEN-TWO
009250     05  FILLER                PIC V9(6) VALUE .932503.           IDEN-TWO
009300     05  FILLER                PIC V9(6) VALUE .922817.           IDEN-TWO
009350     05  FILLER                PIC V9(6) VALUE .912423.           IDEN-TWO
009400     05  FILLER                PIC V9(6) VALUE .901344.           IDEN-TWO
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009450    05  FILLER          PIC V9(6) VALUE .889605.          IDEN-TWO
009500    05  FILLER          PIC V9(6) VALUE .877240.          IDEN-TWO
009550    05  FILLER          PIC V9(6) VALUE .864282.          IDEN-TWO
009600    05  FILLER          PIC V9(6) VALUE .850771.          IDEN-TWO
009650    05  FILLER          PIC V9(6) VALUE .836775.          IDEN-TWO
009700    05  FILLER          PIC V9(6) VALUE .822247.          IDEN-TWO
009750    05  FILLER          PIC V9(6) VALUE .807333.          IDEN-TWO
009800    05  FILLER          PIC V9(6) VALUE .792013.          IDEN-TWO
009850    05  FILLER          PIC V9(6) VALUE .776363.          IDEN-TWO
009900    05  FILLER          PIC V9(6) VALUE .760418.          IDEN-TWO
009950    05  FILLER          PIC V9(6) VALUE .744220.          IDEN-TWO
010000    05  FILLER          PIC V9(6) VALUE .727811.          IDEN-TWO
010050    05  FILLER          PIC V9(6) VALUE .711235.          IDEN-TWO
010100    05  FILLER          PIC V9(6) VALUE .694529.          IDEN-TWO
010150    05  FILLER          PIC V9(6) VALUE .677735.          IDEN-TWO
010200    05  FILLER          PIC V9(6) VALUE .660887.          IDEN-TWO
010250    05  FILLER          PIC V9(6) VALUE .644019.          IDEN-TWO
010300    05  FILLER          PIC V9(6) VALUE .627167.          IDEN-TWO
010350    05  FILLER          PIC V9(6) VALUE .610360.          IDEN-TWO
010400    05  FILLER          PIC V9(6) VALUE .593628.          IDEN-TWO
010450    05  FILLER          PIC V9(6) VALUE .576998.          IDEN-TWO
010500    05  FILLER          PIC V9(6) VALUE .560495.          IDEN-TWO
010550    05  FILLER          PIC V9(6) VALUE .544143.          IDEN-TWO
010600    05  FILLER          PIC V9(6) VALUE .527959.          IDEN-TWO
010650    05  FILLER          PIC V9(6) VALUE .511970.          IDEN-TWO
010700    05  FILLER          PIC V9(6) VALUE .496192.          IDEN-TWO
010750    05  FILLER          PIC V9(6) VALUE .480634.          IDEN-TWO
010800    05  FILLER          PIC V9(6) VALUE .465318.          IDEN-TWO
010850    05  FILLER          PIC V9(6) VALUE .450256.          IDEN-TWO
010900    05  FILLER          PIC V9(6) VALUE .435454.          IDEN-TWO
010950    05  FILLER          PIC V9(6) VALUE .420930.          IDEN-TWO
011000    05  FILLER          PIC V9(6) VALUE .406684.          IDEN-TWO
011050    05  FILLER          PIC V9(6) VALUE .392730.          IDEN-TWO
011100    05  FILLER          PIC V9(6) VALUE .379072.          IDEN-TWO
011150    05  FILLER          PIC V9(6) VALUE .365714.          IDEN-TWO
011200    05  FILLER          PIC V9(6) VALUE .352662.          IDEN-TWO
011250    05  FILLER          PIC V9(6) VALUE .339918.          IDEN-TWO
011300    05  FILLER          PIC V9(6) VALUE .327484.          IDEN-TWO
011350    05  FILLER          PIC V9(6) VALUE .315364.          IDEN-TWO
011400    05  FILLER          PIC V9(6) VALUE .303556.          IDEN-TWO
011450    05  FILLER          PIC V9(6) VALUE .292060.          IDEN-TWO
011500    05  FILLER          PIC V9(6) VALUE .280874.          IDEN-TWO
011550    05  FILLER          PIC V9(6) VALUE .270000.          IDEN-TWO
011600    05  FILLER          PIC V9(6) VALUE .259434.          IDEN-TWO
011650    05  FILLER          PIC V9(6) VALUE .249174.          IDEN-TWO
011700    05  FILLER          PIC V9(6) VALUE .239220.          IDEN-TWO
011750    05  FILLER          PIC V9(6) VALUE .229566.          IDEN-TWO
011800    05  FILLER          PIC V9(6) VALUE .220206.          IDEN-TWO
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011850      05  FILLER                  PIC V9(6) VALUE .211140.                IDEN-TWO
011900      05  FILLER                  PIC V9(6) VALUE .202364.                IDEN-TWO
011950      05  FILLER                  PIC V9(6) VALUE .193872.                IDEN-TWO
012000      05  FILLER                  PIC V9(6) VALUE .185658.                IDEN-TWO
012050      05  FILLER                  PIC V9(6) VALUE .177718.                IDEN-TWO
012100      05  FILLER                  PIC V9(6) VALUE .170050.                IDEN-TWO
012150      05  FILLER                  PIC V9(6) VALUE .162644.                IDEN-TWO
012200      05  FILLER                  PIC V9(6) VALUE .155498.                IDEN-TWO
012250      05  FILLER                  PIC V9(6) VALUE .148606.                IDEN-TWO
012300      05  FILLER                  PIC V9(6) VALUE .141962.                IDEN-TWO
012350      05  FILLER                  PIC V9(6) VALUE .135558.                IDEN-TWO
012400      05  FILLER                  PIC V9(6) VALUE .129388.                IDEN-TWO
012450      05  FILLER                  PIC V9(6) VALUE .123452.                IDEN-TWO
012500      05  FILLER                  PIC V9(6) VALUE .117742.                IDEN-TWO
012550      05  FILLER                  PIC V9(6) VALUE .112250.                IDEN-TWO
012600      05  FILLER                  PIC V9(6) VALUE .106970.                IDEN-TWO
012650      05  FILLER                  PIC V9(6) VALUE .101896.                IDEN-TWO
012700      05  FILLER                  PIC V9(6) VALUE .097028.                IDEN-TWO
012750      05  FILLER                  PIC V9(6) VALUE .092352.                IDEN-TWO
012800      05  FILLER                  PIC V9(6) VALUE .087868.                IDEN-TWO
012850      05  FILLER                  PIC V9(6) VALUE .083568.                IDEN-TWO
012900      05  FILLER                  PIC V9(6) VALUE .079444.                IDEN-TWO
012950      05  FILLER                  PIC V9(6) VALUE .075495.                IDEN-TWO
013000      05  FILLER                  PIC V9(6) VALUE .071712.                IDEN-TWO
013050      05  FILLER                  PIC V9(6) VALUE .068092.                IDEN-TWO
013100      05  FILLER                  PIC V9(6) VALUE .064630.                IDEN-TWO
013150      05  FILLER                  PIC V9(6) VALUE .061318.                IDEN-TWO
013200      05  FILLER                  PIC V9(6) VALUE .058152.                IDEN-TWO
013250      05  FILLER                  PIC V9(6) VALUE .055128.                IDEN-TWO
013300      05  FILLER                  PIC V9(6) VALUE .052244.                IDEN-TWO
013350      05  FILLER                  PIC V9(6) VALUE .049488.                IDEN-TWO
013400      05  FILLER                  PIC V9(6) VALUE .046858.                IDEN-TWO
013450      05  FILLER                  PIC V9(6) VALUE .044350.                IDEN-TWO
013500      05  FILLER                  PIC V9(6) VALUE .041960.                IDEN-TWO
013550      05  FILLER                  PIC V9(6) VALUE .039682.                IDEN-TWO
013600      05  FILLER                  PIC V9(6) VALUE .037514.                IDEN-TWO
013650      05  FILLER                  PIC V9(6) VALUE .035448.                IDEN-TWO
013700      05  FILLER                  PIC V9(6) VALUE .033484.                IDEN-TWO
013750      05  FILLER                  PIC V9(6) VALUE .031618.                IDEN-TWO
013800      05  FILLER                  PIC V9(6) VALUE .029842.                IDEN-TWO
013850      05  FILLER                  PIC V9(6) VALUE .028154.                IDEN-TWO
013900      05  FILLER                  PIC V9(6) VALUE .026552.                IDEN-TWO
013950      05  FILLER                  PIC V9(6) VALUE .025030.                IDEN-TWO
014000      05  FILLER                  PIC V9(6) VALUE .023558.                IDEN-TWO
014050      05  FILLER                  PIC V9(6) VALUE .022218.                IDEN-TWO
014100      05  FILLER                  PIC V9(6) VALUE .020920.                IDEN-TWO
014150      05  FILLER                  PIC V9(6) VALUE .019690.                IDEN-TWO
014200      05  FILLER                  PIC V9(6) VALUE .018524.                IDEN-TWO
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014250      05  FILLER                 PIC V9(6) VALUE .017422.                IDEN-TWO
014300      05  FILLER                 PIC V9(6) VALUE .016378.                IDEN-TWO
014350      05  FILLER                 PIC V9(6) VALUE .015390.                IDEN-TWO
014400      05  FILLER                 PIC V9(6) VALUE .014456.                IDEN-TWO
014450      05  FILLER                 PIC V9(6) VALUE .013574.                IDEN-TWO
014500      05  FILLER                 PIC V9(6) VALUE .012740.                IDEN-TWO
014550      05  FILLER                 PIC V9(6) VALUE .011952.                IDEN-TWO
014600      05  FILLER                 PIC V9(6) VALUE .011209.                IDEN-TWO
014650      05  FILLER                 PIC V9(6) VALUE .010508.                IDEN-TWO
014700      05  FILLER                 PIC V9(6) VALUE .009846.                IDEN-TWO
014750      05  FILLER                 PIC V9(6) VALUE .009223.                IDEN-TWO
014800      05  FILLER                 PIC V9(6) VALUE .008636.                IDEN-TWO
014850      05  FILLER                 PIC V9(6) VALUE .008083.                IDEN-TWO
014900      05  FILLER                 PIC V9(6) VALUE .007562.                IDEN-TWO
014950      05  FILLER                 PIC V9(6) VALUE .007072.                IDEN-TWO
015000      05  FILLER                 PIC V9(6) VALUE .006611.                IDEN-TWO
015050      05  FILLER                 PIC V9(6) VALUE .006177.                IDEN-TWO
015100      05  FILLER                 PIC V9(6) VALUE .005770.                IDEN-TWO
015150      05  FILLER                 PIC V9(6) VALUE .005388.                IDEN-TWO
015200      05  FILLER                 PIC V9(6) VALUE .005028.                IDEN-TWO
015250      05  FILLER                 PIC V9(6) VALUE .004691.                IDEN-TWO
015300      05  FILLER                 PIC V9(6) VALUE .004375.                IDEN-TWO
015350      05  FILLER                 PIC V9(6) VALUE .004078.                IDEN-TWO
015400      05  FILLER                 PIC V9(6) VALUE .003800.                IDEN-TWO
015450      05  FILLER                 PIC V9(6) VALUE .003540.                IDEN-TWO
015500      05  FILLER                 PIC V9(6) VALUE .003296.                IDEN-TWO
015550      05  FILLER                 PIC V9(6) VALUE .003068.                IDEN-TWO
015600      05  FILLER                 PIC V9(6) VALUE .002845.                IDEN-TWO
015650      05  FILLER                 PIC V9(6) VALUE .002645.                IDEN-TWO
015700 01   KS-ALFA-TABLE REDEFINES KS-ALFA-TABLE-VALUES.                      IDEN-TWO
015750      05  KS-ALFA                PIC V9(6) OCCURS 155 TIMES.             IDEN-TWO
015800 01   TITLE.                                                             IDEN-TWO
015850      05  FILLER                 PIC X(38) VALUE SPACES.                 IDEN-TWO
015900      05  FILLER                 PIC X(38) VALUE 'IDEN-TWO, ACTUAL SAMIDEN-TWO
015950-     'PLE LANGUAGE IS:'.                                             IDEN-TWO
016000      05  ANS                    PIC X(20).                              IDEN-TWO
016050      05  FILLER                 PIC X(37) VALUE SPACES.                 IDEN-TWO
016100 01   COL-HEAD.                                                         IDEN-TWO
016150      05  FILLER                 PIC X(74) VALUE SPACES.                 IDEN-TWO
016200      05  FILLER                 PIC X(15) VALUE 'LANGUAGE'.             IDEN-TWO
016250      05  FILLER                 PIC X(44) VALUE 'SIGNIFICANCE LEVEL'.IDEN-TWO
016300 01   TITLE-UL.                                                         IDEN-TWO
016350      05  FILLER                 PIC X(76) VALUE SPACES.                 IDEN-TWO
016400      05  FILLER                 PIC X(20) VALUE ALL '_'.                IDEN-TWO
016450      05  FILLER                 PIC X(37) VALUE SPACES.                 IDEN-TWO
016500 01   COL-HEAD-UL.                                                       IDEN-TWO
016550      05  FILLER                 PIC X(74) VALUE SPACES.                 IDEN-TWO
016600      05  FILLER                 PIC X(8) VALUE ALL '_'.                 IDEN-TWO
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016650      05  FILLER                 PIC X(7) VALUE SPACES.                IDEN-TWO
016700      05  FILLER                 PIC X(18) VALUE ALL ' '.              IDEN-TWO
016750      05  FILLER                 PIC X(26) VALUE SPACES.               IDEN-TWO
016800 01   O-LINE-ONE.                                                      IDEN-TWO
016850      05  FILLER                 PIC X(24) VALUE SPACES.               IDEN-TWO
016900      05  FILLER                 PIC X(18) VALUE 'IDENTIFIED BY YULE'.IDEN-TWO
016950      05  FILLER                 PIC X     VALUE QUOTE.                IDEN-TWO
017000      05  FILLER                 PIC X(30) VALUE 'S K FOR SINGLE LETTEIDEN-TWO
017050-     'RS AS:'.                                                       IDEN-TWO
017100      05  BANK-ONE               PIC X(30).                            IDEN-TWO
017150      05  FILLER                 PIC X(30) VALUE SPACES.               IDEN-TWO
017200 01   O-LINE-TWO.                                                      IDEN-TWO
017250      05  FILLER                 PIC X(24) VALUE SPACES.               IDEN-TWO
017300      05  FILLER                 PIC X(18) VALUE 'IDENTIFIED BY YULE'.IDEN-TWO
017350      05  FILLER                 PIC X     VALUE QUOTE.                IDEN-TWO
017400      05  FILLER                 PIC X(30) VALUE 'S K FOR X(2)/X(1) ASIDEN-TWO
017450-     ':'.                                                            IDEN-TWO
017500      05  BANK-TWO               PIC X(30).                            IDEN-TWO
017550      05  FILLER                 PIC X(30) VALUE SPACES.               IDEN-TWO
017600 01   O-LINE-THREE.                                                    IDEN-TWO
017650      05  FILLER                 PIC X(24) VALUE SPACES.               IDEN-TWO
017700      05  FILLER                 PIC X(18) VALUE 'IDENTIFIED BY YULE'.IDEN-TWO
017750      05  FILLER                 PIC X     VALUE QUOTE.                IDEN-TWO
017800      05  FILLER                 PIC X(30) VALUE 'S K FOR X(3)/X(1) ASIDEN-TWO
017850-     ':'.                                                            IDEN-TWO
017900      05  BANK-THREE             PIC X(30).                            IDEN-TWO
017950      05  FILLER                 PIC X(30) VALUE SPACES.               IDEN-TWO
018000 01   O-LINE-FOUR.                                                     IDEN-TWO
018050      05  FILLER                 PIC X(24) VALUE SPACES.               IDEN-TWO
018100      05  FILLER                 PIC X(49) VALUE 'IDENTIFIED BY K-S TEIDEN-TWO
018150-     'ST FOR VOW-CONS ORDER AS:'.                                    IDEN-TWO
018200      05  BANK-FOUR              PIC X(30).                            IDEN-TWO
018250      05  FILLER                 PIC X(30) VALUE SPACES.               IDEN-TWO
018300 01   O-LINE-FIVE.                                                     IDEN-TWO
018350      05  FILLER                 PIC X(24) VALUE SPACES.               IDEN-TWO
018400      05  FILLER                 PIC X(49) VALUE 'IDENTIFIED BY K-S TEIDEN-TWO
018450-     'ST FOR SINGLE LETTERS AS:'.                                    IDEN-TWO
018500      05  BANK-FIVE              PIC X(30).                            IDEN-TWO
018550      05  FILLER                 PIC X(30) VALUE SPACES.               IDEN-TWO
018600 01   O-LINE-SIX.                                                      IDEN-TWO
018650      05  FILLER                 PIC X(24) VALUE SPACES.               IDEN-TWO
018700      05  FILLER                 PIC X(49) VALUE 'IDENTIFIED BY K-S TEIDEN-TWO
018750-     'ST FOR X(2)/X(1) AS:'.                                         IDEN-TWO
018800      05  BANK-SIX               PIC X(30).                            IDEN-TWO
018850      05  FILLER                 PIC X(30) VALUE SPACES.               IDEN-TWO
018900 01   O-LINE-SEVEN.                                                    IDEN-TWO
018950      05  FILLER                 PIC X(24) VALUE SPACES.               IDEN-TWO
019000      05  FILLER                 PIC X(49) VALUE 'IDENTIFIED BY K-S TEIDEN-TWO
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019050-     'ST FOR X(3)/X(1) AS:'.                                      IDEN-TWO
019100      05  BANK-SEVEN          PIC X(30).                          IDEN-TWO
019150      05  FILLER              PIC X(30) VALUE SPACES.             IDEN-TWO
019200 01   BANK-FORM.                                                   IDEN-TWO
019250      05  BANK-LANG           PIC X(10).                          IDEN-TWO
019300      05  FILLER              PIC X(10) VALUE SPACES.             IDEN-TWO
019350      05  BANK-EQUAL          PIC X.                              IDEN-TWO
019400      05  BANK-ALFA           PIC B9.9(6).                        IDEN-TWO
019450 01   ERROR-LINE.                                                  IDEN-TWO
019500      05  FILLER              PIC X(21) VALUE ALL '*'.            IDEN-TWO
019550      05  FILLER              PIC X(20) VALUE 'OVERFLOW ERROR ON:'.IDEN-TWO
019600      05  ERROR-ANS           PIC X(20).                          IDEN-TWO
019650      05  FILLER              PIC X(72) VALUE ALL '*'.            IDEN-TWO
019700 01   DATA-FORM.                                                   IDEN-TWO
019750      05  CL                  PIC X, OCCURS 73 TIMES.             IDEN-TWO
019800 01   IND-PROB-TABLE.                                              IDEN-TWO
019850      05  ILP                 PIC 9V9(5) COMP SYNC OCCURS 34 TIMES.IDEN-TWO
019900 01   VC-CRF-TABLE.                                               IDEN-TWO
019950      05  VC-CRF              PIC 9V9(5) COMP SYNC OCCURS 4 TIMES. IDEN-TWO
020000 01   O-LINE-EIGHT.                                               IDEN-TWO
020050      05  FILLER              PIC X.                              IDEN-TWO
020100      05  FILLER              PIC X(14) VALUE 'SAMPLE SIZE = '.   IDEN-TWO
020150      05  BANK-EIGHT          PIC ZZZ9.                           IDEN-TWO
020200      05  FILLER              PIC X(29) VALUE ' SINGLE LETTERS CONTIDEN-TWO
020250-     'AINED ON '.                                                 IDEN-TWO
020300      05  O-CARD-NR           PIC ZZ9.                            IDEN-TWO
020350      05  FILLER              PIC X(82) VALUE ' CARDS.'.          IDEN-TWO
020400 PROCEDURE DIVISION.                                               IDEN-TWO
020450 START-UP.                                                         IDEN-TWO
020500      OPEN INPUT SAMPLE, OUTPUT RESULT.                            IDEN-TWO
020550      MOVE 1 TO A.                                                 IDEN-TWO
020600      MOVE 0 TO L, CARD-NR.                                        IDEN-TWO
020650      PERFORM ENG-FILL-1 33 TIMES.                                 IDEN-TWO
020700      READ SAMPLE AT END GO TO DEFAULT.                            IDEN-TWO
020750      ADD 1 TO CARD-NR.                                            IDEN-TWO
020800      PERFORM ENG-CK-1.                                            IDEN-TWO
020850      MOVE CRF-IN (1) TO ENG-ICRF (34).                            IDEN-TWO
020900      MOVE 1 TO A, B.                                              IDEN-TWO
020950      MOVE 0 TO L, CARD-NR.                                        IDEN-TWO
021000      PERFORM ENG-FILL-2 1155 TIMES.                               IDEN-TWO
021050      READ SAMPLE AT END GO TO DEFAULT.                            IDEN-TWO
021100      ADD 1 TO CARD-NR.                                            IDEN-TWO
021150      PERFORM ENG-CK-2.                                            IDEN-TWO
021200      MOVE CRF-IN (1) TO ENG-DCRF (34, 34).                        IDEN-TWO
021250      MOVE 1 TO A.                                                 IDEN-TWO
021300      MOVE 35 TO B.                                                IDEN-TWO
021350      MOVE 0 TO L, CARD-NR.                                        IDEN-TWO
021400      PERFORM ENG-FILL-3 1155 TIMES.                               IDEN-TWO
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021450      READ SAMPLE AT END GO TO DEFAULT.                                IDEN-TWO
021500      ADD 1 TO CARD-NR.                                                IDEN-TWO
021550      PERFORM ENG-CK-3.                                                IDEN-TWO
021600      MOVE CRF-IN (1) TO ENG-DCRF (34, 68).                            IDEN-TWO
021650      MOVE 1 TO A.                                                     IDEN-TWO
021700      MOVE 0 TO L, CARD-NR.                                            IDEN-TWO
021750      PERFORM SPAN-FILL-1 33 TIMES.                                    IDEN-TWO
021800      READ SAMPLE AT END GO TO DEFAULT.                                IDEN-TWO
021850      ADD 1 TO CARD-NR.                                                IDEN-TWO
021900      PERFORM SPAN-CK-1.                                               IDEN-TWO
021950      MOVE CRF-IN (1) TO SPAN-ICRF (34).                               IDEN-TWO
022000      MOVE 1 TO A, B.                                                  IDEN-TWO
022050      MOVE 0 TO L, CARD-NR.                                            IDEN-TWO
022100      PERFORM SPAN-FILL-2 1155 TIMES.                                  IDEN-TWO
022150      READ SAMPLE AT END GO TO DEFAULT.                                IDEN-TWO
022200      ADD 1 TO CARD-NR.                                                IDEN-TWO
022250      PERFORM SPAN-CK-2.                                               IDEN-TWO
022300      MOVE CRF-IN (1) TO SPAN-DCRF (34, 34).                           IDEN-TWO
022350      MOVE 1 TO A.                                                     IDEN-TWO
022400      MOVE 35 TO B.                                                    IDEN-TWO
022450      MOVE 0 TO L, CARD-NR.                                            IDEN-TWO
022500      PERFORM SPAN-FILL-3 1155 TIMES.                                  IDEN-TWO
022550      READ SAMPLE AT END GO TO DEFAULT.                                IDEN-TWO
022600      ADD 1 TO CARD-NR.                                                IDEN-TWO
022650      PERFORM SPAN-CK-3.                                               IDEN-TWO
022700      MOVE CRF-IN (1) TO SPAN-DCRF (34, 68).                           IDEN-TWO
022750      MOVE ZEROS TO CARD-NR.                                           IDEN-TWO
022800 ALPHA.                                                                IDEN-TWO
022850      PERFORM READ-A-CARD.                                             IDEN-TWO
022900      MOVE 2 TO N.                                                     IDEN-TWO
022950 BRAVO.                                                                IDEN-TWO
023000      IF CL (N) = SPACE GO TO CK-ONE.                                  IDEN-TWO
023050      PERFORM FIRST-LETTER-CHECK THRU FIRST-EXIT.                      IDEN-TWO
023100      IF MATCH = ZERO GO TO CK-ONE.                                    IDEN-TWO
023150      ADD 1 TO ILF (A) ON SIZE ERROR GO TO ALERT.                      IDEN-TWO
023200      COMPUTE M = N + 1.                                               IDEN-TWO
023250      IF M = 73 PERFORM SHIFT-TWO.                                     IDEN-TWO
023300      IF CL (M) = SPACE GO TO CK-TWO.                                  IDEN-TWO
023350      PERFORM SECOND-LETTER-CHECK THRU SECOND-EXIT.                    IDEN-TWO
023400      IF MATCH = ZERO GO TO CK-TWO.                                    IDEN-TWO
023450 CHARLIE.                                                              IDEN-TWO
023500      ADD 1 TO FOL-FREQ (A, B) ON SIZE ERROR GO TO ALERT.              IDEN-TWO
023550      PERFORM VC-TALLEY THRU VC-EXIT.                                  IDEN-TWO
023600      COMPUTE L = N + 2.                                               IDEN-TWO
023650      IF L = 73 AND CL (73) = '-' PERFORM SHIFT-THREE.                 IDEN-TWO
023700      IF L = 73 AND CL (73) NOT = '-' PERFORM ALT-THREE.               IDEN-TWO
023750      IF CL (L) = SPACE GO TO CK-THREE.                                IDEN-TWO
023800      PERFORM THIRD-LETTER-CHECK THRU THIRD-EXIT.                      IDEN-TWO
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023850      IF MATCH = ZERO GO TO CK-THREE.                                IDEN-TWO
023900 DELTA.                                                              IDEN-TWO
023950      COMPUTE B = B + 34.                                            IDEN-TWO
024000      ADD 1 TO FOL-FREQ (A, B) ON SIZE ERROR GO TO ALERT.            IDEN-TWO
024050 ECHO.                                                               IDEN-TWO
024100      ADD 1 TO N.                                                    IDEN-TWO
024150      GO TO BRAVO.                                                   IDEN-TWO
024200 CK-ONE.                                                             IDEN-TWO
024250      ADD 1 TO ILF (34) ON SIZE ERROR GO TO ALERT.                   IDEN-TWO
024300      ADD 1 TO N.                                                    IDEN-TWO
024350      MOVE 34 TO A.                                                  IDEN-TWO
024400 CK-ONE-ALPHA.                                                       IDEN-TWO
024450      IF N = 73 PERFORM SHIFT-ONE.                                   IDEN-TWO
024500      IF CL (N) = SPACE GO TO CK-ONE-BRAVO.                          IDEN-TWO
024550      COMPUTE N = N - 1.                                             IDEN-TWO
024600      PERFORM SECOND-LETTER-CHECK THRU SECOND-EXIT.                  IDEN-TWO
024650      IF MATCH = 1 GO TO CHARLIE, ELSE ADD 1 TO N.                   IDEN-TWO
024700 CK-ONE-BRAVO.                                                       IDEN-TWO
024750      ADD 1 TO N.                                                    IDEN-TWO
024800      GO TO CK-ONE-ALPHA.                                            IDEN-TWO
024850 CK-TWO.                                                             IDEN-TWO
024900      ADD 1 TO FOL-FREQ (A, 34) ON SIZE ERROR GO TO ALERT.           IDEN-TWO
024950      ADD 1 TO N.                                                    IDEN-TWO
025000 CK-TWO-ALPHA.                                                       IDEN-TWO
025050      COMPUTE M = N + 1.                                             IDEN-TWO
025100      IF M = 73 PERFORM SHIFT-TWO.                                   IDEN-TWO
025150      IF CL (M) = SPACE GO TO CK-TWO-BRAVO.                          IDEN-TWO
025200      COMPUTE N = N - 1.                                             IDEN-TWO
025250      PERFORM THIRD-LETTER-CHECK THRU THIRD-EXIT.                    IDEN-TWO
025300      IF MATCH = 1 GO TO DELTA, ELSE ADD 1 TO N.                     IDEN-TWO
025350 CK-TWO-BRAVO.                                                       IDEN-TWO
025400      ADD 1 TO N.                                                    IDEN-TWO
025450      GO TO CK-TWO-ALPHA.                                            IDEN-TWO
025500 CK-THREE.                                                           IDEN-TWO
025550      ADD 1 TO FOL-FREQ (A, 68) ON SIZE ERROR GO TO ALERT.           IDEN-TWO
025600      GO TO ECHO.                                                    IDEN-TWO
025650 SHIFT-ONE.                                                          IDEN-TWO
025700      PERFORM READ-A-CARD.                                           IDEN-TWO
025750      MOVE SPACES TO CL (1), CL (2).                                 IDEN-TWO
025800      MOVE 3 TO N.                                                   IDEN-TWO
025850 SHIFT-TWO.                                                          IDEN-TWO
025900      MOVE CL (72) TO CL (2).                                        IDEN-TWO
025950      PERFORM READ-A-CARD.                                           IDEN-TWO
026000      MOVE 2 TO N.                                                   IDEN-TWO
026050      MOVE 3 TO M.                                                   IDEN-TWO
026100 SHIFT-THREE.                                                        IDEN-TWO
026150      MOVE CL (72) TO CL (2).                                        IDEN-TWO
026200      PERFORM READ-A-CARD.                                           IDEN-TWO
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026250      MOVE 1 TO N.                                                IDEN-TWO
026300      MOVE 3 TO L.                                                IDEN-TWO
026350 ALT-THREE.                                                       IDEN-TWO
026400      MOVE CL (72) TO CL (1).                                     IDEN-TWO
026450      MOVE SPACES TO CL (2).                                      IDEN-TWO
026500      PERFORM READ-A-CARD.                                        IDEN-TWO
026550      MOVE 0 TO N.                                                IDEN-TWO
026600      MOVE 2 TO L.                                                IDEN-TWO
026650 ENG-FILL-1.                                                      IDEN-TWO
026700      IF L = 0 READ SAMPLE AT END GO TO DEFAULT.                  IDEN-TWO
026750      IF L = 0 ADD 1 TO CARD-NR PERFORM ENG-CK-1.                 IDEN-TWO
026800      ADD 1 TO L.                                                 IDEN-TWO
026850      MOVE CRF-IN (L) TO ENG-ICRF (A).                            IDEN-TWO
026900      ADD 1 TO A.                                                 IDEN-TWO
026950      IF L = 11 MOVE ZERO TO L.                                   IDEN-TWO
027000 ENG-CK-1.                                                         IDEN-TWO
027050      IF DC-ID NOT = 'D' OR DC-SEQ NOT = CARD-NR                  IDEN-TWO
027100          OR DC-LANG NOT = 'ENGLISH P ' GO TO DEFAULT.            IDEN-TWO
027150 ENG-FILL-2.                                                      IDEN-TWO
027200      IF L = 0 READ SAMPLE AT END GO TO DEFAULT.                  IDEN-TWO
027250      IF L = 0 ADD 1 TO CARD-NR PERFORM ENG-CK-2.                 IDEN-TWO
027300      ADD 1 TO L.                                                 IDEN-TWO
027350      MOVE CRF-IN (L) TO ENG-DCRF (A, B).                         IDEN-TWO
027400      IF B = 34,                                                  IDEN-TWO
027450          ADD 1 TO A,                                             IDEN-TWO
027500          MOVE ZERO TO B.                                         IDEN-TWO
027550      ADD 1 TO B.                                                 IDEN-TWO
027600      IF L = 11 MOVE ZERO TO L.                                   IDEN-TWO
027650 ENG-CK-2.                                                         IDEN-TWO
027700      IF DC-ID NOT = 'E' OR DC-SEQ NOT = CARD-NR                  IDEN-TWO
027750          OR DC-LANG NOT = 'ENGLISH P ' GO TO DEFAULT.            IDEN-TWO
027800 ENG-FILL-3.                                                      IDEN-TWO
027850      IF L = 0 READ SAMPLE AT END GO TO DEFAULT.                  IDEN-TWO
027900      IF L = 0 ADD 1 TO CARD-NR PERFORM ENG-CK-3.                 IDEN-TWO
027950      ADD 1 TO L.                                                 IDEN-TWO
028000      MOVE CRF-IN (L) TO ENG-DCRF (A, B).                         IDEN-TWO
028050      IF B = 68,                                                  IDEN-TWO
028100          ADD 1 TO A,                                             IDEN-TWO
028150          MOVE 34 TO B.                                           IDEN-TWO
028200      ADD 1 TO B.                                                 IDEN-TWO
028250      IF L = 11 MOVE ZERO TO L.                                   IDEN-TWO
028300 ENG-CK-3.                                                         IDEN-TWO
028350      IF DC-ID NOT = 'F' OR DC-SEQ NOT = CARD-NR                  IDEN-TWO
028400          OR DC-LANG NOT = 'ENGLISH P ' GO TO DEFAULT.            IDEN-TWO
028450 SPAN-FILL-1.                                                     IDEN-TWO
028500      IF L = 0 READ SAMPLE AT END GO TO DEFAULT.                  IDEN-TWO
028550      IF L = 0 ADD 1 TO CARD-NR PERFORM SPAN-CK-1.                IDEN-TWO
028600      ADD 1 TO L.                                                 IDEN-TWO
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028650     MOVE CRF-IN (L) TO SPAN-ICRF (A).                                IDEN-TWO
028700     ADD 1 TO A.                                                      IDEN-TWO
028750     IF L = 11 MOVE ZERO TO L.                                        IDEN-TWO
028800 SPAN-CK-1.                                                           IDEN-TWO
028850     IF DC-ID NOT = 'D' OR DC-SEQ NOT = CARD-NR                       IDEN-TWO
028900         OR DC-LANG NOT = 'SPANISH P ' GO TO DEFAULT.                 IDEN-TWO
028950 SPAN-FILL-2.                                                         IDEN-TWO
029000     IF L = 0 READ SAMPLE AT END GO TO DEFAULT.                       IDEN-TWO
029050     IF L = 0 ADD 1 TO CARD-NR PERFORM SPAN-CK-2.                     IDEN-TWO
029100     ADD 1 TO L.                                                      IDEN-TWO
029150     MOVE CRF-IN (L) TO SPAN-DCRF (A, B).                             IDEN-TWO
029200     IF B = 34,                                                       IDEN-TWO
029250         ADD 1 TO A,                                                  IDEN-TWO
029300         MOVE ZERO TO B.                                              IDEN-TWO
029350     ADD 1 TO B.                                                      IDEN-TWO
029400     IF L = 11 MOVE ZERO TO L.                                        IDEN-TWO
029450 SPAN-CK-2.                                                           IDEN-TWO
029500     IF DC-ID NOT = 'E' OR DC-SEQ NOT = CARD-NR                       IDEN-TWO
029550         OR DC-LANG NOT = 'SPANISH P ' GO TO DEFAULT.                 IDEN-TWO
029600 SPAN-FILL-3.                                                         IDEN-TWO
029650     IF L = 0 READ SAMPLE AT END GO TO DEFAULT.                       IDEN-TWO
029700     IF L = 0 ADD 1 TO CARD-NR PERFORM SPAN-CK-3.                     IDEN-TWO
029750     ADD 1 TO L.                                                      IDEN-TWO
029800     MOVE CRF-IN (L) TO SPAN-DCRF (A, B).                             IDEN-TWO
029850     IF B = 68,                                                       IDEN-TWO
029900         ADD 1 TO A,                                                  IDEN-TWO
029950         MOVE 34 TO B.                                                IDEN-TWO
030000     ADD 1 TO B.                                                      IDEN-TWO
030050     IF L = 11 MOVE ZERO TO L.                                        IDEN-TWO
030100 SPAN-CK-3.                                                           IDEN-TWO
030150     IF DC-ID NOT = 'F' OR DC-SEQ NOT = CARD-NR                       IDEN-TWO
030200         OR DC-LANG NOT = 'SPANISH P ' GO TO DEFAULT.                 IDEN-TWO
030250 DEFAULT.                                                             IDEN-TWO
030300     MOVE ' RUN TERMINATED DUE TO INPUT SEQUENCE ERROR ' TO           IDEN-TWO
030350         PRINT-LINE.                                                  IDEN-TWO
030400     WRITE PRINT-LINE AFTER PAGE-TOP.                                 IDEN-TWO
030450     CLOSE SAMPLE, RESULT.                                            IDEN-TWO
030500     STOP RUN.                                                        IDEN-TWO
030550 ALERT.                                                               IDEN-TWO
030600     WRITE PRINT-LINE FROM ERROR-LINE AFTER PAGE-TOP.                 IDEN-TWO
030650 CYCLE.                                                               IDEN-TWO
030700     READ SAMPLE AT END GO TO EOJ.                                    IDEN-TWO
030750     IF NEXT-SAMPLE GO TO RESTART.                                    IDEN-TWO
030800     GO TO CYCLE.                                                     IDEN-TWO
030850 RESTART.                                                             IDEN-TWO
030900     PERFORM INITIALIZE-RT.                                           IDEN-TWO
030950     PERFORM DAT-SHIFT VARYING X FROM 1 BY 1 UNTIL X > 71.            IDEN-TWO
031000     ADD 1 TO CARD-NR.                                                IDEN-TWO
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031050      MOVE 2 TO N.                                                IDEN-TWO
031100      GO TO BRAVO.                                                IDEN-TWO
031150 CLOSE-OUT-RT.                                                    IDEN-TWO
031200      SUBTRACT 1 FROM ILF (34).                                   IDEN-TWO
031250      PERFORM IND-TOTAL-CALC VARYING A FROM 1 BY 1 UNTIL A > 34.  IDEN-TWO
031300      PERFORM IND-PROB-CALC VARYING A FROM 1 BY 1 UNTIL A > 34.   IDEN-TWO
031350      PERFORM YULE-PREP VARYING A FROM 1 BY 1 UNTIL A > 34.       IDEN-TWO
031400      COMPUTE K ROUNDED = (10000 * (S - ILF-TOTAL)) /             IDEN-TWO
031450          (ILF-TOTAL ** 2).                                       IDEN-TWO
031500      COMPUTE Z-ENG ROUNDED = (K - 747.77) * (CARD-NR ** .5) /    IDEN-TWO
031550          95.973.                                                 IDEN-TWO
031600      COMPUTE Z-SPAN ROUNDED = (K - 806.481) * (CARD-NR ** .5) /  IDEN-TWO
031650          77.81.                                                  IDEN-TWO
031700      PERFORM LANG-CK-K THRU LANG-CK-K-EXIT.                      IDEN-TWO
031750      WRITE PRINT-LINE FROM TITLE AFTER PAGE-TOP.                 IDEN-TWO
031800      WRITE PRINT-LINE FROM TITLE-UL BEFORE 4.                    IDEN-TWO
031850      WRITE PRINT-LINE FROM COL-HEAD BEFORE 0.                    IDEN-TWO
031900      WRITE PRINT-LINE FROM COL-HEAD-UL BEFORE 2.                 IDEN-TWO
031950      MOVE BANK-FORM TO BANK-ONE.                                 IDEN-TWO
032000      WRITE PRINT-LINE FROM O-LINE-ONE BEFORE 2.                  IDEN-TWO
032050      PERFORM CRILP-CALC VARYING A FROM 2 BY 1 UNTIL A > 34.      IDEN-TWO
032100      PERFORM DEPN-TWO-SUM VARYING A FROM 1 BY 1 UNTIL A > 34     IDEN-TWO
032150          AFTER B FROM 1 BY 1 UNTIL B > 34.                       IDEN-TWO
032200      PERFORM DEPN-TWO-PROB VARYING A FROM 1 BY 1 UNTIL A > 34    IDEN-TWO
032250          AFTER B FROM 1 BY 1 UNTIL B > 34.                       IDEN-TWO
032300      MOVE ZEROS TO S.                                            IDEN-TWO
032350      PERFORM YULES-K-PREP VARYING A FROM 1 BY 1 UNTIL A > 34     IDEN-TWO
032400          AFTER B FROM 1 BY 1 UNTIL B > 34.                       IDEN-TWO
032450      COMPUTE K ROUNDED = (10000 * (S - FOL-FREQ-TOTAL)) /        IDEN-TWO
032500          (FOL-FREQ-TOTAL ** 2).                                  IDEN-TWO
032550      COMPUTE Z-ENG ROUNDED = (K - 87.93) * (CARD-NR ** .5) /     IDEN-TWO
032600          31.618.                                                 IDEN-TWO
032650      COMPUTE Z-SPAN ROUNDED = (K - 108.784) * (CARD-NR ** .5) /  IDEN-TWO
032700          30.665.                                                 IDEN-TWO
032750      PERFORM LANG-CK-K THRU LANG-CK-K-EXIT.                      IDEN-TWO
032800      MOVE BANK-FORM TO BANK-TWO.                                 IDEN-TWO
032850      WRITE PRINT-LINE FROM O-LINE-TWO BEFORE 2.                  IDEN-TWO
032900      PERFORM CR-FOL-PROB-CALC VARYING A FROM 1 BY 1 UNTIL A > 34 IDEN-TWO
032950          AFTER B FROM 1 BY 1 UNTIL B > 34.                       IDEN-TWO
033000      MOVE FOL-FREQ-TOTAL TO FFT2.                                IDEN-TWO
033050      MOVE ZEROS TO FOL-FREQ-TOTAL, CRF-TOTAL.                    IDEN-TWO
033100      PERFORM DEPN-TWO-SUM VARYING A FROM 1 BY 1 UNTIL A > 34     IDEN-TWO
033150          AFTER B FROM 35 BY 1 UNTIL B > 68.                      IDEN-TWO
033200      PERFORM DEPN-TWO-PROB VARYING A FROM 1 BY 1 UNTIL A > 34    IDEN-TWO
033250          AFTER B FROM 35 BY 1 UNTIL B > 68.                      IDEN-TWO
033300      MOVE ZEROS TO S.                                            IDEN-TWO
033350      PERFORM YULES-K-PREP VARYING A FROM 1 BY 1 UNTIL A > 34     IDEN-TWO
033400          AFTER B FROM 35 BY 1 UNTIL B > 68.                      IDEN-TWO
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033450      COMPUTE K ROUNDED = (10000 * (S - FOL-FREQ-TOTAL)) /          IDEN-TWO
033500          (FOL-FREQ-TOTAL ** 2).                                    IDEN-TWO
033550      COMPUTE Z-ENG ROUNDED = (K - 73.139) * (CARD-NR ** .5) /      IDEN-TWO
033600          27.466.                                                   IDEN-TWO
033650      COMPUTE Z-SPAN ROUNDED = (K - 83.553) * (CARD-NR ** .5) /     IDEN-TWO
033700          22.886.                                                   IDEN-TWO
033750      PERFORM LANG-CK-K THRU LANG-CK-K-EXIT.                        IDEN-TWO
033800      MOVE BANK-FORM TO BANK-THREE.                                 IDEN-TWO
033850      WRITE PRINT-LINE FROM O-LINE-THREE BEFORE 2.                  IDEN-TWO
033900      PERFORM CR-FOL-PROB-CALC VARYING A FROM 1 BY 1 UNTIL A > 34   IDEN-TWO
033950          AFTER B FROM 35 BY 1 UNTIL B > 68.                        IDEN-TWO
034000      COMPUTE VC-TOTAL = F-CONS-CONS + F-VOW-CONS + F-CONS-VOW      IDEN-TWO
034050          + F-VOW-VOW ON SIZE ERROR GO TO ALERT.                    IDEN-TWO
034100      IF F-VOW-VOW > 0                                              IDEN-TWO
034150          COMPUTE VC-CRF (1) ROUNDED = F-VOW-VOW / VC-TOTAL         IDEN-TWO
034200          ELSE MOVE ZEROS TO VC-CRF (1).                            IDEN-TWO
034250      IF F-CONS-VOW > 0                                             IDEN-TWO
034300          COMPUTE VC-CRF (2) ROUNDED = (F-CONS-VOW / VC-TOTAL)      IDEN-TWO
034350              + VC-CRF (1)                                          IDEN-TWO
034400          ELSE MOVE VC-CRF (1) TO VC-CRF (2).                       IDEN-TWO
034450      IF F-VOW-CONS > 0                                             IDEN-TWO
034500          COMPUTE VC-CRF (3) ROUNDED = (F-VOW-CONS / VC-TOTAL)      IDEN-TWO
034550              + VC-CRF (2)                                          IDEN-TWO
034600          ELSE MOVE VC-CRF (2) TO VC-CRF (3).                       IDEN-TWO
034650      IF F-CONS-CONS > 0                                            IDEN-TWO
034700          COMPUTE VC-CRF (4) ROUNDED = (F-CONS-CONS / VC-TOTAL)     IDEN-TWO
034750              + VC-CRF (3)                                          IDEN-TWO
034800          ELSE MOVE VC-CRF (3) TO VC-CRF (4).                       IDEN-TWO
034850      PERFORM ENG-VC-DCK VARYING A FROM 1 BY 1 UNTIL A > 4.         IDEN-TWO
034900      PERFORM SPAN-VC-DCK VARYING A FROM 1 BY 1 UNTIL A > 4.        IDEN-TWO
034950      MOVE VC-TOTAL TO SAMPLE-SIZE.                                 IDEN-TWO
035000      PERFORM LANG-CK-KS.                                           IDEN-TWO
035050      MOVE BANK-FORM TO BANK-FOUR.                                  IDEN-TWO
035100      WRITE PRINT-LINE FROM O-LINE-FOUR BEFORE 2.                   IDEN-TWO
035150      MOVE ZEROS TO ENG-D, SPAN-D.                                  IDEN-TWO
035200      PERFORM ENG-KS-CK1 VARYING A FROM 1 BY 1 UNTIL A > 34.        IDEN-TWO
035250      PERFORM SPAN-KS-CK1 VARYING A FROM 1 BY 1 UNTIL A > 34.       IDEN-TWO
035300      MOVE ILF-TOTAL TO SAMPLE-SIZE.                                IDEN-TWO
035350      PERFORM LANG-CK-KS.                                           IDEN-TWO
035400      MOVE BANK-FORM TO BANK-FIVE.                                  IDEN-TWO
035450      WRITE PRINT-LINE FROM O-LINE-FIVE BEFORE 2.                   IDEN-TWO
035500      MOVE ZEROS TO ENG-D, SPAN-D.                                  IDEN-TWO
035550      PERFORM ENG-KS-CK2 VARYING A FROM 1 BY 1 UNTIL A > 34         IDEN-TWO
035600          AFTER B FROM 1 BY 1 UNTIL B > 34.                         IDEN-TWO
035650      PERFORM SPAN-KS-CK2 VARYING A FROM 1 BY 1 UNTIL A > 34        IDEN-TWO
035700          AFTER B FROM 1 BY 1 UNTIL B > 34.                         IDEN-TWO
035750      MOVE EFT2 TO SAMPLE-SIZE.                                     IDEN-TWO
035800      PERFORM LANG-CK-KS.                                           IDEN-TWO
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035850      MOVE BANK-FORM TO BANK-SIX.                                IDEN-TWO
035900      WRITE PRINT-LINE FROM O-LINE-SIX BEFORE 2.                 IDEN-TWO
035950      MOVE ZEROS TO ENG-D, SPAN-D.                               IDEN-TWO
036000      PERFORM ENG-KS-CK2 VARYING A FROM 1 BY 1 UNTIL A > 34      IDEN-TWO
036050          AFTER B FROM 35 BY 1 UNTIL B > 68.                     IDEN-TWO
036100      PERFORM SPAN-KS-CK2 VARYING A FROM 1 BY 1 UNTIL A > 34     IDEN-TWO
036150          AFTER B FROM 35 BY 1 UNTIL B > 68.                     IDEN-TWO
036200      MOVE FOL-FREQ-TOTAL TO SAMPLE-SIZE.                        IDEN-TWO
036250      PERFORM LANG-CK-KS.                                        IDEN-TWO
036300      MOVE BANK-FORM TO BANK-SEVEN.                              IDEN-TWO
036350      WRITE PRINT-LINE FROM O-LINE-SEVEN BEFORE 2.               IDEN-TWO
036400      MOVE ILF-TOTAL TO BANK-EIGHT.                              IDEN-TWO
036450      MOVE CARD-NR TO O-CARD-NR.                                 IDEN-TWO
036500      WRITE PRINT-LINE FROM O-LINE-EIGHT AFTER 2.                IDEN-TWO
036550 INITIALIZE-RT.                                                  IDEN-TWO
036600      MOVE TEST-NAME TO ANS, ERROR-ANS.                          IDEN-TWO
036650      MOVE ZEROS TO A, B, N, S, L, M, X, Y, VC-TOTAL, F-CONS-CONS, IDEN-TWO
036700          F-VOW-CONS, F-CONS-VOW, F-VOW-VOW, FOL-FREQ-TOTAL,     IDEN-TWO
036750          ILF-TOTAL, CARD-NR, K, Z-ENG, Z-SPAN, Z, P, J, Z2,     IDEN-TWO
036800          CRF-TOTAL, D, ENG-D, SPAN-D, SAMPLE-SIZE, E, T, FFT2.  IDEN-TWO
036850      PERFORM ZEROING-ONE VARYING A FROM 1 BY 1 UNTIL A > 34.    IDEN-TWO
036900      PERFORM ZEROING-TWO VARYING A FROM 1 BY 1 UNTIL A > 34     IDEN-TWO
036950          AFTER B FROM 1 BY 1 UNTIL B > 68.                      IDEN-TWO
037000 LANG-CK-K.                                                      IDEN-TWO
037050      IF Z-ENG = Z-SPAN,                                         IDEN-TWO
037100          MOVE 'NO DECSN' TO BANK-LANG,                          IDEN-TWO
037150          MOVE Z-ENG TO Z.                                       IDEN-TWO
037200      IF Z-ENG > Z-SPAN,                                         IDEN-TWO
037250          MOVE 'SPANISH' TO BANK-LANG,                           IDEN-TWO
037300          MOVE Z-SPAN TO Z.                                      IDEN-TWO
037350      IF Z-ENG < Z-SPAN,                                         IDEN-TWO
037400          MOVE 'ENGLISH' TO BANK-LANG,                           IDEN-TWO
037450          MOVE Z-ENG TO Z.                                       IDEN-TWO
037500      IF Z > 4                                                   IDEN-TWO
037550          MOVE 0.000060 TO BANK-ALFA                             IDEN-TWO
037600          MOVE '<' TO BANK-EQUAL                                 IDEN-TWO
037650          GO TO LANG-CK-K-EXIT.                                  IDEN-TWO
037700      COMPUTE Z2 ROUNDED = Z ** 2.                               IDEN-TWO
037750      COMPUTE P ROUNDED = (1 / 6) * Z2.                          IDEN-TWO
037800      COMPUTE J = 1 - P ON SIZE ERROR GO TO ALERT.               IDEN-TWO
037850      COMPUTE P ROUNDED = (P / 6.66666666667) * Z2.              IDEN-TWO
037900      COMPUTE J = J + P ON SIZE ERROR GO TO ALERT.               IDEN-TWO
037950      COMPUTE P ROUNDED = (P / 8.4) * Z2.                        IDEN-TWO
038000      COMPUTE J = J - P ON SIZE ERROR GO TO ALERT.               IDEN-TWO
038050      COMPUTE P ROUNDED = (P / 10.28571428571) * Z2.             IDEN-TWO
038100      COMPUTE J = J + P ON SIZE ERROR GO TO ALERT.               IDEN-TWO
038150      COMPUTE P ROUNDED = (P / 12.22222222222) * Z2.             IDEN-TWO
038200      COMPUTE J = J - P ON SIZE ERROR GO TO ALERT.               IDEN-TWO
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038250      COMPUTE P ROUNDED = (P / 14.18181818182) * Z2.                IDEN-TWO
038300      COMPUTE J = J + P ON SIZE ERROR GO TO ALERT.                  IDEN-TWO
038350      COMPUTE P ROUNDED = (P / 16.15384615385) * Z2.                IDEN-TWO
038400      COMPUTE J = J - P ON SIZE ERROR GO TO ALERT.                  IDEN-TWO
038450      COMPUTE P ROUNDED = (P / 18.13333333333) * Z2.                IDEN-TWO
038500      COMPUTE J = J + P ON SIZE ERROR GO TO ALERT.                  IDEN-TWO
038550      COMPUTE P ROUNDED = (P / 20.11764705882) * Z2.                IDEN-TWO
038600      COMPUTE J = J - P ON SIZE ERROR GO TO ALERT.                  IDEN-TWO
038650      COMPUTE P ROUNDED = (P / 22.10526315789) * Z2.                IDEN-TWO
038700      COMPUTE J = J + P ON SIZE ERROR GO TO ALERT.                  IDEN-TWO
038750      COMPUTE P ROUNDED = (P / 24.09523809524) * Z2.                IDEN-TWO
038800      COMPUTE J = J - P ON SIZE ERROR GO TO ALERT.                  IDEN-TWO
038850      COMPUTE P ROUNDED = (P / 26.08695652174) * Z2.                IDEN-TWO
038900      COMPUTE J = J + P ON SIZE ERROR GO TO ALERT.                  IDEN-TWO
038950      COMPUTE P ROUNDED = (P / 28.08) * Z2.                         IDEN-TWO
039000      COMPUTE J = J - P ON SIZE ERROR GO TO ALERT.                  IDEN-TWO
039050      COMPUTE P ROUNDED = (P / 30.07407407407) * Z2.                IDEN-TWO
039100      COMPUTE J = J + P ON SIZE ERROR GO TO ALERT.                  IDEN-TWO
039150      COMPUTE P ROUNDED = (P / 32.06896551724) * Z2.                IDEN-TWO
039200      COMPUTE J = J - P ON SIZE ERROR GO TO ALERT.                  IDEN-TWO
039250      COMPUTE P ROUNDED = (P / 34.06451612903) * Z2.                IDEN-TWO
039300      COMPUTE J = J + P ON SIZE ERROR GO TO ALERT.                  IDEN-TWO
039350      COMPUTE P ROUNDED = (P / 36.06060606061) * Z2.                IDEN-TWO
039400      COMPUTE J = J - P ON SIZE ERROR GO TO ALERT.                  IDEN-TWO
039450      COMPUTE P ROUNDED = (P / 38.05714285714) * Z2.                IDEN-TWO
039500      COMPUTE J = J + P ON SIZE ERROR GO TO ALERT.                  IDEN-TWO
039550      COMPUTE P ROUNDED = (P / 40.05405405405) * Z2.                IDEN-TWO
039600      COMPUTE J = J - P ON SIZE ERROR GO TO ALERT.                  IDEN-TWO
039650      COMPUTE P ROUNDED = (P / 42.05128205128) * Z2.                IDEN-TWO
039700      COMPUTE J = J + P ON SIZE ERROR GO TO ALERT.                  IDEN-TWO
039750      COMPUTE P ROUNDED = (P / 44.04878048780) * Z2.                IDEN-TWO
039800      COMPUTE J = J - P ON SIZE ERROR GO TO ALERT.                  IDEN-TWO
039850      COMPUTE P ROUNDED = (P / 46.04651162791) * Z2.                IDEN-TWO
039900      COMPUTE J = J + P ON SIZE ERROR GO TO ALERT.                  IDEN-TWO
039950      COMPUTE P ROUNDED = (P / 48.04444444444) * Z2.                IDEN-TWO
040000      COMPUTE J = J - P ON SIZE ERROR GO TO ALERT.                  IDEN-TWO
040050      COMPUTE P ROUNDED = (P / 50.042553191) * Z2.                  IDEN-TWO
040100      COMPUTE J = J + P ON SIZE ERROR GO TO ALERT.                  IDEN-TWO
040150      COMPUTE P ROUNDED = (P / 52.040816326) * Z2.                  IDEN-TWO
040200      COMPUTE J = J - P ON SIZE ERROR GO TO ALERT.                  IDEN-TWO
040250      COMPUTE P ROUNDED = (P / 54.039215686) * Z2.                  IDEN-TWO
040300      COMPUTE J = J + P ON SIZE ERROR GO TO ALERT.                  IDEN-TWO
040350      COMPUTE P ROUNDED = (P / 56.037735849) * Z2.                  IDEN-TWO
040400      COMPUTE J = J - P ON SIZE ERROR GO TO ALERT.                  IDEN-TWO
040450      COMPUTE P ROUNDED = (P / 58.03636) * Z2.                      IDEN-TWO
040500      COMPUTE J = J + P ON SIZE ERROR GO TO ALERT.                  IDEN-TWO
040550      COMPUTE P ROUNDED = (P / 60.03509) * Z2.                      IDEN-TWO
040600      COMPUTE J = J - P ON SIZE ERROR GO TO ALERT.                  IDEN-TWO
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040650     COMPUTE P ROUNDED = (P / 62.03) * Z2.                          IDEN-TWO
040700     COMPUTE J = J + P ON SIZE ERROR GO TO ALERT.                   IDEN-TWO
040750     COMPUTE BANK-ALFA ROUNDED = 1 - (2 * (Z * .3989422804014 *     IDEN-TWO
040800         J)).                                                       IDEN-TWO
040850     MOVE SPACES TO BANK-EQUAL.                                     IDEN-TWO
040900 LANG-CK-K-EXIT.  EXIT.                                              IDEN-TWO
040950 CRILP-CALC.                                                         IDEN-TWO
041000     COMPUTE B = A - 1.                                             IDEN-TWO
041050     COMPUTE ILP (A) = ILP (B) + ILP (A).                           IDEN-TWO
041100 IND-TOTAL-CALC.                                                     IDEN-TWO
041150     COMPUTE ILF-TOTAL = ILF-TOTAL + ILF (A).                       IDEN-TWO
041200 IND-PROB-CALC.                                                      IDEN-TWO
041250     IF ILF (A) > 0 COMPUTE ILP (A) ROUNDED =                       IDEN-TWO
041300         (ILF (A) / ILF-TOTAL), ELSE MOVE ZEROS TO ILP (A).         IDEN-TWO
041350 YULE-PREP.                                                         IDEN-TWO
041400     COMPUTE S = S + (ILF (A) ** 2).                                IDEN-TWO
041450 DEPN-TWO-SUM.                                                      IDEN-TWO
041500     COMPUTE FOL-FREQ-TOTAL = FOL-FREQ-TOTAL + FOL-FREQ (A, B).     IDEN-TWO
041550 DEPN-TWO-PROB.                                                     IDEN-TWO
041600     IF FOL-FREQ (A, B) > 0 COMPUTE FOL-PROB (A, B) ROUNDED =       IDEN-TWO
041650         (FOL-FREQ (A, B) / FOL-FREQ-TOTAL), ELSE MOVE ZEROS        IDEN-TWO
041700         TO FOL-PROB (A, B).                                        IDEN-TWO
041750 YULES-K-PREP.                                                      IDEN-TWO
041800     COMPUTE S = S + (FOL-FREQ (A, B) ** 2).                        IDEN-TWO
041850 CR-FOL-PROB-CALC.                                                  IDEN-TWO
041900     COMPUTE CRF-TOTAL = CRF-TOTAL + FOL-PROB (A, B).               IDEN-TWO
041950     MOVE CRF-TOTAL TO FOL-PROB (A, B).                             IDEN-TWO
042000 ENG-VC-DCK.                                                        IDEN-TWO
042050     COMPUTE D = ENG-VC-CRF (A) - VC-CRF (A).                       IDEN-TWO
042100     IF D > ENG-D MOVE D TO ENG-D.                                  IDEN-TWO
042150 SPAN-VC-DCK.                                                       IDEN-TWO
042200     COMPUTE D = SPAN-VC-CRF (A) - VC-CRF (A).                      IDEN-TWO
042250     IF D > SPAN-D MOVE D TO SPAN-D.                                IDEN-TWO
042300 LANG-CK-KS.                                                        IDEN-TWO
042350     IF ENG-D = SPAN-D,                                             IDEN-TWO
042400         MOVE 'NO DECSN' TO BANK-LANG,                              IDEN-TWO
042450         MOVE ENG-D TO D.                                           IDEN-TWO
042500     IF ENG-D > SPAN-D,                                             IDEN-TWO
042550         MOVE 'SPANISH' TO BANK-LANG,                               IDEN-TWO
042600         MOVE SPAN-D TO D.                                          IDEN-TWO
042650     IF ENG-D < SPAN-D,                                             IDEN-TWO
042700         MOVE 'ENGLISH' TO BANK-LANG,                               IDEN-TWO
042750         MOVE ENG-D TO D.                                           IDEN-TWO
042800     COMPUTE Z2 ROUNDED = SAMPLE-SIZE ** .5.                        IDEN-TWO
042850     COMPUTE E ROUNDED = D * Z2.                                    IDEN-TWO
042900     IF E < .28,                                                    IDEN-TWO
042950         MOVE '>' TO BANK-EQUAL,                                    IDEN-TWO
043000         MOVE KS-ALFA (1) TO BANK-ALFA.                             IDEN-TWO
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043050      IF E > 1.82,                                                IDEN-TWO
043100          MOVE '<' TO BANK-EQUAL,                                 IDEN-TWO
043150          MOVE KS-ALFA (155) TO BANK-ALFA.                        IDEN-TWO
043200      IF E > .27 AND E < 1.83,                                    IDEN-TWO
043250          COMPUTE T ROUNDED = (100 * E) - 27,                     IDEN-TWO
043300          MOVE KS-ALFA (T) TO BANK-ALFA,                          IDEN-TWO
043350          MOVE SPACES TO BANK-EQUAL.                              IDEN-TWO
043400 ENG-KS-CK1.                                                      IDEN-TWO
043450      COMPUTE D = ENG-ICRF (A) - ILP (A).                         IDEN-TWO
043500      IF D > ENG-D MOVE D TO ENG-D.                               IDEN-TWO
043550 SPAN-KS-CK1.                                                     IDEN-TWO
043600      COMPUTE D = SPAN-ICRF (A) - ILP (A).                        IDEN-TWO
043650      IF D > SPAN-D MOVE D TO SPAN-D.                             IDEN-TWO
043700 ENG-KS-CK2.                                                      IDEN-TWO
043750      COMPUTE D = ENG-DCRF (A, B) - FOL-PROB (A, B).              IDEN-TWO
043800      IF D > ENG-D MOVE D TO ENG-D.                               IDEN-TWO
043850 SPAN-KS-CK2.                                                     IDEN-TWO
043900      COMPUTE D = SPAN-DCRF (A, B) - FOL-PROB (A, B).             IDEN-TWO
043950      IF D > SPAN-D MOVE D TO SPAN-D.                             IDEN-TWO
044000 ZEROING-ONE.                                                     IDEN-TWO
044050      MOVE ZEROS TO ILF (A), ILP (A).                             IDEN-TWO
044100 ZEROING-TWO.                                                     IDEN-TWO
044150      MOVE ZEROS TO FOL-FREQ (A, B), FOL-PROB (A, B).             IDEN-TWO
044200 READ-A-CARD.                                                     IDEN-TWO
044250      READ SAMPLE AT END GO TO EOJ.                               IDEN-TWO
044300      IF NEXT-SAMPLE GO TO FLUSH.                                 IDEN-TWO
044350      ADD 1 TO CARD-NR ON SIZE ERROR GO TO ALERT.                 IDEN-TWO
044400      PERFORM DAT-SHIFT VARYING X FROM 1 BY 1 UNTIL X > 71.       IDEN-TWO
044450 DAT-SHIFT.                                                       IDEN-TWO
044500      COMPUTE Y = X + 2.                                          IDEN-TWO
044550      MOVE CC (X) TO CL (Y).                                      IDEN-TWO
044600 FLUSH.                                                           IDEN-TWO
044650      IF CARD-NR NOT = ZERO PERFORM CLOSE-OUT-RT.                 IDEN-TWO
044700      PERFORM INITIALIZE-RT.                                      IDEN-TWO
044750      GO TO ALPHA.                                                IDEN-TWO
044800 EOJ.                                                             IDEN-TWO
044850      PERFORM CLOSE-OUT-RT.                                       IDEN-TWO
044900      MOVE SPACES TO PRINT-LINE.                                  IDEN-TWO
044950      WRITE PRINT-LINE AFTER PAGE-TOP.                            IDEN-TWO
045000      CLOSE SAMPLE, RESULT.                                       IDEN-TWO
045050      STOP RUN.                                                   IDEN-TWO
045100 FIRST-LETTER-CHECK.                                              IDEN-TWO
045150      MOVE 1 TO A.                                                IDEN-TWO
045200      MOVE ZERO TO MATCH.                                         IDEN-TWO
045250 FLC-ALPHA.                                                       IDEN-TWO
045300      IF CL (N) = LTR (A) GO TO FLC-BRAVO.                        IDEN-TWO
045350      IF A = 33 GO TO FIRST-EXIT.                                 IDEN-TWO
045400      ADD 1 TO A.                                                 IDEN-TWO
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045450      GO TO FLC-ALPHA.                                                IDEN-TWO
045500 FLC-BRAVO.                                                           IDEN-TWO
045550      MOVE 1 TO MATCH.                                                IDEN-TWO
045600 FIRST-EXIT.  EXIT.                                                   IDEN-TWO
045650 SECOND-LETTER-CHECK.                                                 IDEN-TWO
045700      MOVE 1 TO B.                                                    IDEN-TWO
045750      MOVE ZERO TO MATCH.                                             IDEN-TWO
045800      COMPUTE M = N + 1.                                              IDEN-TWO
045850 SLC-ALPHA.                                                           IDEN-TWO
045900      IF CL (M) = LTR (B) GO TO SLC-BRAVO.                            IDEN-TWO
045950      IF B = 33 GO TO SECOND-EXIT.                                    IDEN-TWO
046000      ADD 1 TO B.                                                     IDEN-TWO
046050      GO TO SLC-ALPHA.                                                IDEN-TWO
046100 SLC-BRAVO.                                                           IDEN-TWO
046150      MOVE 1 TO MATCH.                                                IDEN-TWO
046200 SECOND-EXIT.  EXIT.                                                  IDEN-TWO
046250 THIRD-LETTER-CHECK.                                                  IDEN-TWO
046300      MOVE 1 TO B.                                                    IDEN-TWO
046350      MOVE ZERO TO MATCH.                                             IDEN-TWO
046400      COMPUTE L = N + 2.                                              IDEN-TWO
046450 TLC-ALPHA.                                                           IDEN-TWO
046500      IF CL (L) = LTR (B) GO TO TLC-BRAVO.                            IDEN-TWO
046550      IF B = 33 GO TO THIRD-EXIT.                                     IDEN-TWO
046600      ADD 1 TO B.                                                     IDEN-TWO
046650      GO TO TLC-ALPHA.                                                IDEN-TWO
046700 TLC-BRAVO.                                                           IDEN-TWO
046750      MOVE 1 TO MATCH.                                                IDEN-TWO
046800 THIRD-EXIT.  EXIT.                                                   IDEN-TWO
046850 VC-TALLEY.                                                           IDEN-TWO
046900      IF A = 34 GO TO VC-EXIT.                                        IDEN-TWO
046950      IF A < 11 AND B < 11 ADD 1 TO F-VOW-VOW ON SIZE ERROR           IDEN-TWO
047000          GO TO ALERT.                                                IDEN-TWO
047050      IF A < 11 AND B NOT < 11 ADD 1 TO F-CONS-VOW ON SIZE            IDEN-TWO
047100          ERROR GO TO ALERT.                                          IDEN-TWO
047150      IF A NOT < 11 AND B < 11 ADD 1 TO F-VOW-CONS ON SIZE            IDEN-TWO
047200          ERROR GO TO ALERT.                                          IDEN-TWO
047250      IF A NOT < 11 AND B NOT < 11 ADD 1 TO F-CONS-CONS ON SIZE       IDEN-TWO
047300          ERROR GO TO ALERT.                                          IDEN-TWO
047350 VC-EXIT.  EXIT.                                                      IDEN-TWO
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